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Teaching and Learning Biology in Kenya

Volume 1
Educating the Elite: Harmony and Conflict

Catherine Namuddu

March 1989

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TEACHING AND LEARNING BIOLOGY IN KENYA

Volume 1

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Catherine Namuddu

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earlier drafts, I wish to point out that I am solely responsible for the expressed views, for any errors, ommissions, biases and conclusions.

CN
May 1988.

Preface

Every school establishes rules and regulations that govern its routines. It is often assumed that routines and regulations are simply lifted out of centrally prescribed codes of school management. The data presented in this report on **Educating The Elite: Harmony and Conflict,** suggest differently. The report describes the educational processes in two national schools in Kenya, studied during a two year period, where it was observed that the heads of school had reformulated the official goals of education from their broader and somewhat ambiguous prescriptions, to narrower and specific formats which guided each school's daily activities.

In presenting the data, emphasis has been placed on isolating characteristics of leadership styles of the heads of school and the responses of teachers and students to the overall management. As the title of the report suggests, areas of harmony and conflict were observed among school personnel as they interacted with one another, and as various groups negotiated meanings and interpretations of beliefs, traditions and practices. The precise causes of both harmony and conflict, although difficult to pinpoint, were generally inherent in the goals of education as well as in the various mechanisms set up in individual schools for the purpose of providing a suitable learning

One of the most prominent areas of latent conflict between school management and students concerned the teaching and learning of social skills. School management expected students to learn social skills such as the value of time, division of labour, tolerance, responsibility, co-operation, service to self and the community through adherence to strict routines punctuated by the bell, and through participation in such activities as parade, farmwork, housework, chapel, clubs and societies. Students, however, seemed to believe that these activities were not relevant and that the school day should consist only of academic lessons, sports and relaxation.

The results and ideas presented here will be useful to policymakers, school heads and teachers interested in school management issues.

The results however, pose a more serious question about current efforts to vocationalize the curriculum. If in evaluating achievement in secondary education, a student's success in academic work continues to receive a disproportionate share of his overall efforts, then it is possible that schools will find it difficult to convince students to learn various technical and social skills presumed by vocational curricula.

CN
May 1988

INTRODUCTION

The research study **Educating The Elite: Harmony and Conflict,** was part of a larger project on **Teaching and Learning Biology in Kenya** which had two aims:

1. To identify practices which take place in schools and classrooms, and to contribute to an understanding of the nature of teachers' perceptions and approaches to teaching students that result from these practices; and

To understand the implications of teachers' and students' perceptions for school achievement and acquisition of general positive behavioural modalities.

The overall research was carried out within a theoretical framework derived from interpretive research methodology (Erickson 1973, 1980, 1986), with interest centred on exposing and clarifying the everyday human meanings in the life of schools. Emphasis was placed on understanding the immediate and local meanings of actions in education as interpreted from the school heads', teachers' and pupils' points of view. Teaching-learning, whether at school, in classrooms or during weekend seminars, was regarded as an event with complex but interrelated processes and products, constructed by the various participants in the event. Processes and results of teaching-learning in particular instances and contexts, were seen as reflecting the phenomena and dynamics of education in the wider society. The processes, products and contexts of schooling therefore, had to be understood in the arena of particular instances to enable classroom teachers, teacher trainers and policy makers to implement realistic intervention in schools, whether for the purpose of improving teaching and learning or for expanding facilities. In examining education as an interpretive process, it was assumed that a holistic conception of education in Kenya should address at least five key questions, namely:

1. What is education as viewed by school heads, teachers, pupils and the broader society in the context of Kenya?

2. What are some of the characteristics of personnel and resources in Kenya schools?

3. How do various school and non-school personnel actualize the purpose of schooling in relationship to their definition of education?

4. Where and how does education take place?

5. How should education happen?

In the research study **Educating The Elite: Harmony and Conflict,** only relatively narrow aspects of each of the above questions were directly addressed. In particular, the study looked at how heads of schools, teachers and students view the goals of education at school and within the broader society of Kenya; and sought to understand how the educators actualized the purpose of schooling in relationship to their definition of the purposes of education.

Secondary school education in Kenya can still be regarded as educating the elite of the nation, given the fact that only about 40% of students who complete primary school, go on to secondary schools. Students in search of a secondary school education, enter some 2700 secondary schools of various quality. Of these schools only 27 so-called national schools are believed to have superior resources and qualified teachers and to generally provide a very convivial environment for learning which results in high student performance on public examinations.

Based on a very strict quota system, the national schools admit students selected on merit from every district in the country. However, apart from a general knowledge about national schools, sometimes bordering on folklore, there has been little research to document the characteristics of such schools. This report presents data from a two year study of two national schools given the pseudonyms Inland High School and Valley High School. Both were old, government maintained, boarding schools recognized for high students' achievment in public examinations. Inland High and Valley High had approximately 650 and 450 male students with a staff of 42 and 38 teachers, respectively.

The study attempted to understand the educational goals and leadership styles of the two schools points through an examination of overall school processes (Dwyer et al. 1982). However, there was no attempt to conceptualize the conduct of the study within frameworks of research that have investigated either school effects, or school administration. Instead, field study methods were used to collect data from the school heads, teachers and students in order to determine the nature of the shared language, perceptions and points of emphasis among school personnel. The study also determined how personnel assessed: the school's goals; the purposes of various school activities in supporting and achieving such goals; the school's present strengths and weaknesses; and the perceptions and definitions of problems that confronted the schools (Good et al. 1986). This meant that the largest portion of the study was spent in tracing interactions between heads, teachers and students, in order to determine how the "shoulds and oughts" (Marshall 1984) became translated into values, meanings and action. Open-ended interviews were conducted in order to determine heads', teachers' and students' philosophies of the goals of schools. All school personnel were observed in an unobtrusive manner (except in classrooms), and descriptive field notes were kept of activities and public utterances.

The researcher spent two years in the two schools observing classes, breaktime, lunch periods, after school clubs and society time, and school events such as; assembly, parade, chapel, roll call, staff meeting and speech days. In addition, students at Inland High School, completed a short questionnaire on School Organisation where they were expected to express their opinions regarding the nature and quality of school management.

Data analysis used the 'comparative method' of Glaser and Strauss (1967), and generated definitions, categories, patterns among participants' utterances, written statements and actions, in order to portray the essential qualities of the characteristic beliefs and behaviours. The results are presented as a comparison of the two schools on criteria such as: school personnel's beliefs, perceptions and actions; characteristics and purposes of school activity; and teachers' and students' responses and reactions to these beliefs, perceptions and activities. However, no attempt has been made to compare the two schools on every aspect since the purpose of the study was to explore the subjective experiences of the school's participants and to identify informal systems and unstated rules which might influence participation in the different environments.

Chapter 1

GOALS FOR EDUCATING THE ELITE

Research generally indicates that academically effective schools are merely schools organized to pursue learning consistently (Tomlinson 1981). And, it is perhaps self-evident that the tasks of promoting learning and order, are closely intertwined in any school situation. Some minimal level of orderliness is necessary to harness students' attention to classroom work and perhaps efficient and effective classwork promotes orderliness within the pace of other school-wide activities.

It would seem that the task of managing a school for learning has at least two main components: (a) goals to be achieved, and (b) a set of instructions, conditions and available resources to reach these goals. From this perspective, the thoughts and actions of the school head, teachers and students can be understood as attempts to assemble and use resources to achieve educational goals in a complex social setting (Doyle 1986). School management however, has two major task structures organized around the problem of ensuring order so as to achieve educational goals. The first of these school management tasks is to instruct students in a broad range of favourable attitudes, beliefs and conceptions; the second is to organize school-wide groups, establish and monitor rules and procedures and react to misbehaviour (Doyle 1980).

Stallings et al. (1981), who examined the effects of school policies on pupils in eight U.S. secondary schools that included a wide variety of policies and organizing plans, concluded that:

> (a) Schools in which policies and rules were clearer and more consistently enforced had higher teacher morale, fewer classroom intrusions, a lower absence rate, less class misbehavior and more time-on-task.
>
> (b) Schools that had more administrative support services and fewer burdensome duties for teachers, had higher teacher morale and less classroom misbehaviour.

(c) A more active and more supportive principal was associated with higher teacher morale and students who felt more friendliness. (Good et al. 1986).

How closely or otherwise, did the beliefs, attitudes, perceptions, and actions of personnel at Inland High and Valley High re-affirm these factors as valid and general conditions of schools with high academic achievement?

Inland High School

Head's Goals for a Secondary Education

Mr. Somo, the head of Inland High, who had been in school management and teaching for over 20 years, said that he believed that the most important role of a school head was to organize, manage, implement, and evaluate what goes on in all aspects of school. Somo believed that public media criticisms of school heads had nurtured two fundamental but erroneous beliefs regarding the head's duties, namely: that school heads have extra time to manage business outside of school hours; and that managing such business was compatible with a head's duties in the school. Somo explained that running a school was a full time job.

> "I cannot see how a statement such as, 'headteachers should not conduct private business during working hours' can be compatible with informed opinion. Heading a school, if done properly, is a full time job. Therefore, the question of working hours does not arise. Statements like that encourage young school administrators to expect to have after-working hours, which is something of a myth."

Somo also believed that a head cannot and should not try to run a school single-handedly;

> "School administration has to be undertaken by all members of staff, plus a cross-section of students, because efficient administration is in the final analysis managing a system on a daily basis. No single person has the mind and energy to do that."

Overall Somo's conception of a good school manager was that of a committed head who organised an efficient system that would lead to high social and academic achievement by students. School management, if done properly, was a full time and joint venture between the head, teachers and students.

The organizing idea of Somo's concept was a philosophy of work which combined the mind as intellectual (academic), the spirit as religious and the body as physical. This philosophy was the single most recurrent theme in Somo's speeches and writings. It was eloquently illustrated by his frequently enunciated comparison between the nature of goals for a secondary education and the types of structural units, routines, activities and events in the school, that he perceived as serving each of the goals.

> "The way we have developed our education over the years, has led us to the belief that passing an examination should be regarded as the basic achievement of secondary school students. Of course, in this school, we have so far done quite well. But I think an equally important achievement of students from this school is the acquisition of a sense of sensible personal and community life. A good school head spends a lot of time implementing teaching towards this goal, and it is high time the public recognised this."

Somo's philosophy of the goals and work of school was underlined by the idea of efficiency in all activity. Since efficiency required "mind and energy", and since no single person has enough of both, the best strategy was to implement a program for training everyone in "a sense of sensible personal and community life". Somo believed that he was himself an efficient manager and indicated that the school was well managed, -- "we do our best".

Chart 1: Somo's Concept of the Goals of a Secondary Education and Relationship to Existing Schools Management Structures and Activities

Goals	Philosophy	Existing Supportive Structure
1. Develop and use all talents and resources available among students in order to make a positive contribution to the existence of a harmonious school community	A daily practical philosophy of community life and service to all	-farmwork -housework/chores -parade/assembly -chapel -head's writings -games -clubs/societies -sharing of resources -organized leisure -community work
2. Develop, sharpen and expand students' intellectual skills in order to pass exams and be ready for future intellectual work	A daily enunciated philosophy and and practice of serious academic work	-Work by the bell -intense teaching -strong subject heads -subject heads' meeting -academic counselling -prep time allocation -continuous assessment
3. Learn to fit in an organize, organized society where there are leaders and organize	A clear division of responsibility organize head, teachers and students in organized to carry out activities and services	-Head's office -academic master -welfare department -career counselling -academic counselling -chapel -prefectship system -games/clubs system -subordinate staff -community work

continued....

Goals	**Philosophy**	**Existing Supportive Structure**
4. Alert students to the broader values expectations and aspirations in society with regard to those who have recieved education	Participation in traditional and cultural events to re-affirm sense of belonging to broader society	-Founder's day -badge test -drama week -field trips -cross country -speech day -old students' day -"burying x-country" -names of buildings

In explaining the components of each of the four goals, Somo emphasized the fact that the manner in which all school activities encompassed all four goals, was the most important criteria for judging good school management. In other words, Somo admitted that even though he might be able to state which specific activities had been designed to contribute toward achieving a particular goal, in actual practice, various management structures and activities contributed towards achieving all goals.

Academic Work

For example, the kind of co-ordination that Somo said had to develop between management routines and academic achievement, was expressed in his welcome-back notices to students at the beginning of each new term. Somo believed that holidays away from school tended to de-activate students' proper working strategies so that students needed to be re-directed to goals and work objectives, during the new term. Moreover, at the beginning of each term, Somo wanted students to find some form of overall evaluation of their previous term's academic and social progress. On 28/4/83 Somo had put up a welcome-back notice in readiness for the second school term beginning in early May. The document, titled *Reminders* , started out by welcoming students back to school. In the third paragraph Somo had written:

> "To every student I say, organize yourself and settle down quickly. Reminders: 1. Use TIME properly. 2. Avoid childish behaviour that will get you into trouble all the time. 3. Every student should help in getting the school to settle down to serious work. 4. Everyone is reminded particularly, in form 4 and 6 that we set our goal for this year to be – 'O' Levels – Division 1 & 2 only; 'A' Levels – 2 Principal and above only."

In addition to these statements of reminders and goals for the whole school, Somo addressed each form level individually, pointing out what students had achieved academically and socially in the previous term, and in cases where improvement was needed, what changes were expected. For example, Somo had written for:

Form 1: "You are now a little older, no longer so green. We expect you to behave a

Form 2: "A few of us are still behaving like babies. This must stop."

Form 3: "Time is running out fast. Make sure your study programme is properly organised and properly followed. We are next for the 'O' levels and we do not want to be caught with our 'Pants Down'. We have settled down well, we just need to improve on it."

Form 4: "...This is the time when we make or break ourselves. ...Show us what you can do in the Academics, Games, Drama, Music...You are young – this is the time to empty all your energy to the satisfaction of your BRAINS, BODY and SOUL."

Form 5: "We have not yet quite seen the positive side of many of you. A few of you are with us...Too many of us have remained quite green over the first term.

Form 6: "The end of our school boy life is coming fast. This is your last chance to use it."

Value of Time and Routine

Somo often referred to the consistent routine in the school as an example of a process that contributed toward the achievement of all goals, even though its basic purpose was to segment time by the bell, so that students would be in the right place at the right time. Indeed, at Inland High, the bell rang 40 different times during a typical 17 hour working day, with the first bell at 5.45 a.m. and the last one at 11.00 p.m. Of these 40 bells, only 11 bells actually signalled the beginning or end of classroom learning. The remaining 29 bells, were either 'warning bells or non-class activity bells'. For instance, at 5.45 a.m., there was a 'warning wake-up bell'; at 8.10 a.m., a 'warning bell for morning classes'; at 1.50 p.m. a 'warning bell for afternoon classes'; and at 9.25 p.m., a 'warning bell for lights-out' for juniors. Other non-class bells were for activities such as waking up, morning work, roll calls, assembly or parade, dining room, games and societies and prep time. Except for the waking and lights-out bells, all other warning bells heralded classroom work. There were no warning bells for housework, dining room, games and clubs or evening prep. Somo had explained that warning bells did not mean that the subsequent activity was any more important than that which preceded it. Rather, warning bells sounded whenever there was to be a dramatic change in the nature of the on-going and subsequent activities. "The purpose is to give an initial alert".

It is often assumed that schools with students who are high achievers in public examinations, allocate maximum time to classroom teaching. This was not the case at Inland High, and Somo stressed the fact that good school management depended on a proportionate distribution and management of the available time among several activities, many of which did not involve classroom teaching. Moreover, Somo stated that he encouraged allocation of duties and time so as to reflect the increasing maturity and intellectual development of students as they moved from junior to senior classes. He was unhappy with the opposite practice where, he pointed out,

> "Unfortunately, it is a fact that in adult life and indeed, in some schools, the tendency is to assign duties in such a way that older students have more leisure and less work than juniors, and [seniors] often have privileges that allow them to skip certain duties particularly, manual duties. This is not good."

Somo had explained how, in his school, the17 hours of an average school day, were distributed among a variety of activities such that the amount of time reflected not only the range of goals to work toward each day; but also the Form level of students participating in various activities.

Table 1 shows the distribution of time among seven key daily activities for Juniors (Forms 1-3); Upper Juniors (Form 4); and Seniors (Forms 5-6). The data appear to support Somo's statements, that Juniors have more free time and less time for prep than Seniors; and that all students spend equal time on manual labour and other regulative activities such as games, roll call and chapel.

Table 1: Distribution of Time Among Daily Activities (Time in Hours and Minutes)

Activities	Juniors	Upper Juniors	Seniors
1. Free time	2:25	1:45	1:45
2. Lunch break	2:35	2:35	2:35
3. Roll calls	0:35	0:35	0:35
4. Chapel	0:15	0:15	0:15
5. Housework	0:35	0:35	0:35
6. Classes	6:05	6:05	6:05
7. Prep time	1:40	2:55	3:45
8. Games/clubs	1:15	1:15	1:15

Juniors had 40 minutes more of leisure time than Seniors, and also 1:15 and 2:05 hours less prep time than Upper Juniors and Seniors, respectively.

Division of Labour

With regard to the third goal of a secondary education, namely to educate each student to fit into an organized society where there are leaders, Somo, believed that apart from bellwork and a consistent routine, there had to be a clear division of labour, previleges and the management of various responsibilities among various school personnel. Consequently, all teachers and a sizeable number of students were engaged in management. For the 42 teachers, there were duties such as 'master on duty' carried out by each teacher three times a term; class teacher; senior and assistant house masters for each of the eight students' houses; dean of studies; school counsellor; and chapel master. The same teacher may be a head of one of the 14 subject departments; a patron of one of the 31 school societies and clubs; and a games master for one of the 10 different sports and games in the school.

At least, 100 of the 650 students were involved in management duties comprehensively referred to as the prefectship system. All prefects were selected by staff because, "If you let students select their own prefects the whole school may be spoiled by fellows with deviant sub-cultures". Consequently, alongside the school captain, there was a deputy, a dining hall prefect, a senior medical prefect, a games captain, a senior chapel prefect, a senior and a junior library prefect, a senior entertainment prefect, a house captain for each of the eight houses and at least six dormitory senior prefects per house. There were class monitors, prep-reminders and, of course, within various subject areas there were group leaders.

Observers however, were unable to find evidence to support Somo's claim that students' privileges were not distributed according to seniority. All Seniors were allowed to wear trousers during the week, something that Juniors were forbidden; Seniors had their own library, a music room and of course, the title 'Seniors' which enabled them to belong to the 'Seniors only' societies and clubs such as mathematics and debating groups. All important positions within the prefectship system were allocated to Seniors and in fact, the school captain as the most Senior student was not allocated normal duties. In addition to his automatic high status, a school captain was entitled to six instead of two school shirts, many instead of two school ties and free milk, served him in his cubicle by a Junior. It was argued that the school captain had been given more shirts and ties because he had to look presentable, at all times, to other students. But if one of the responsibilities of being a Senior was to serve as model for Juniors, it could be argued, that a school captain should have been required to demonstrate his maturity and superior qualities by being exemplary using the same quantity of resources as allocated to other students.

Somo considered it very important that teachers be involved in societies, clubs and games. On 4/6/81 he had authored a document entitled: *The Aim of A School* which was still displayed on the teachers' notice-board in 1985. Somo had drawn the researcher's attention to this document during a discussion of the possible causes of strikes by students in schools and universites. Somo had stated that one of the fundamental causes of school strikes was failure by students to balance their expectations with what can be reasonably expected of society at large. In Somo's words:

> "I think the problem is really our fault. We must instill in our pupils the goodwill towards their fellow students and all Kenyans. We have talked too vaguely about education and independence. The children cannot find something tangible when we speak of independence. We have talked of independence in economic terms without clearly spelling out what it should be in developing goodwill."

Somo had explained that Inland High's comprehensive training program was designed to work toward fulfilling that purpose. In *Aims of a School*, Somo had told teachers:

> "The academic training alone is not sufficient preparation of a secondary high school student for his career. With his academic education there must be opportunities for the development of the qualities of: 1) self-discipline; 2) honesty (integrity); 3) service to others; 4) using one's common sense; 5) loyalty to ones country; 6) readiness to accept responsibility and the ability to live simply and get along with others; 7) attention to duty; 8) leadership; 9) self-reliance; 10) hard work; and 11) determination (will)."

Later in the document, Somo had exhorted teachers:

> "........It is necessary for us teachers to see ourselves as the experts and the force behind such a comprehensive type of training. This calls for teachers themselves to be 1-11 above. ...We might not be good at games, drama, etc., but if we are there to provide leadership, determination etc., our students would benefit more than when we are not there because we are not the experts."

Somo had explained that he accepted the argument that a teacher cannot teach properly a classroom subject in which he did not feel confident. But he was unprepared to accept as reasonable the claim that a teacher could not participate in a particular extra-curricular activity because the teacher did not know what to do:

> "....this sort of argument makes a teacher sound not properly educated. If we are saying that teachers are educated and qualified to teach, we are saying that they have passed through an educational system in which all these so called extra-curricular activities were part and parcel of learning. They were not meant to excel in them. They were only meant to participate in them. To the extent that they have participated in them, they should be able to help others participate in them too."

Somo said however, that good management often consisted of elements of ordering others around, persuading, compromising, backing down and pushing to the very last possible limit. Somo said that he felt that most of the ordering around of people was necessary only because many people had not learned to use their common sense. In fact, use of common sense was the subject of five documents written by Somo and displayed on student notice boards. At the beginning of every new term he wrote something about common sense. He had explained that this timing was crucial since most students seemed to regress during holidays particularly, in the use of their common sense. For instance, on 26/8/83, (the beginning of the third term) Somo had written and displayed a document entitled, *Guiding Instructions*, in which he set out the rationale and procedures for students of 11 school regulations concerning: general discipline; school boundaries; medical facilities; clothing; teaching rooms; pocket money and fees; electricity; personal radios; smoking and drinking; punishment; loitering and vagrancy; and treatment of visitors. In conclusion to the two page, 19 item document, Somo had written,

> "These are only a few guiding instructions but there are many others that we could apply through our Common Sense. Let COMMON SENSE be the main GUIDING FACTOR in this school, to help us achieve what we want to achieve with the minimum difficulties. We all have COMMON SENSE, let us use it."

Asked whether members of staff ever contributed to the ideas in the various documents, Somo had stated that since staff held a meeting each day and at the end of each term, the documents often summarized teachers' observations of how particular groups of students went about their learning and duties on a daily basis and how they had performed throughout the term. Somo, however, emphasized that many of the emphasized he wrote were based on his own observation of what was going on in the school and how it compared with what he expected of the school.

Valley High School

Head's Goals and Style of Management

Mr Kazi, the head of Valley High School, had some 12 years of experience in teaching and school management. Kazi lived on the school campus and arrived regularly into his office at 7.45 a.m. He would attend the 15 minutes' daily assembly for the whole school, and would often leave the school at around 11.00 a.m. often not to return until the following day. Judged from what he frequently reiterated at assembly, Kazi regarded good management as a collective venture between himself and teachers as evidenced by his sustained public praise of the "good work being done by all teachers". In exhorting students to continue to work hard on their studies in order to "maintain the level of the very good achievement in the school", on at least 21 occasions, Kazi had stated:

> "We the teachers, are determined to do our part. We shall continue to do

> everything possible to teach as well as we have been doing in the past. So it is up to you to follow this example and work equally hard."

Kazi's definition of the goals of a secondary education were not articulated further. It appeared from his actions, that he believed that if classroom learning and high students' performance were good, it indicated that school management was proper and effective. Only one undated document written by Kazi entitled, *Rules and Regulations* was observed on the noticeboards in 1983. The document stated in part:

> "Students are expected to behave as gentlemen at all time... Shirts MUST always be tucked into the shorts or trousers...Students MUST obey all school rules... All arrangements for cleaning-up MUST be adhered to strictly. All students MUST play their part to make the school as tidy as possible."

Three other items in this document were underlined namely: RESPECT FOR PROPERTY, WALKS AND TRIPS TO TOWN, and OFF-LIMITS. Kazi had emphasized during an interview that students were in school to learn knowledge and skills that they would need in order to pursue various careers in the future. He explained that the school's curriculum with its specific emphasis on science and technical subjects was particularly important in training students in the sciences in order to meet national requirements for manpower development. Kazi believed that the school admitted very bright students and that as long as students attended classes and obeyed school rules, academic achievement would be ensured. Several other documents on various noticeboards and in the staffroom consisted of letters of congratulations on the school's high performance in public examinations sent by 'important' old school boys -- mainly government officials, company executives and university teachers. All other documents which littered the noticeboards had been authored by individual teachers on subjects such as sports, athletics, clubs, student lists, and past examination results.

Division of Labour

It would appear that Kazi had evolved a management style that ensured that his main goal- high academic achievement- would be pursued during his long absences. Indeed, the collective nature of management which he often referred to, was designed precisely for this purpose, implanting in the minds of teachers and students the belief that the smooth occurrence of daily teaching and learning was more or less equivalent to good management. Thus, as long as teachers taught, there would be no management problems. In essence, Kazi had delegated almost all his responsibilities and duties to senior teachers, the bursar and a few students. Such widespread delegation ensured that whenever the head was away, nothing would come to a standstill.

But this almost total delegation of responsibilities and duties was not supported by comprehensive co-ordination of activity and information gathering as observed at Inland High. The result was that even though Kazi was known to be the school head, he was not seen by teachers to be in effective control of the school's management. Evidence of Kazi's lack of overall control over school affairs was in fact, provided by him in that whenever he was asked to give his opinion or to supply information on school factors such as; students' discipline, school societies and clubs, or examinations, he would almost always call in a particular teacher, explaining, 'She or he is our expert on ...that's the one to talk to'.

Similarly, while Valley High had all the usual school paraphernalia of structural units, duties, activities and routines, many such units only existed on paper, since there was little or no exchange of information among them. Structural units and duties were more often talked about because they concerned activities that are expected to be found in any school than because they fulfilled a specific purpose in this particular school.

Summary

It is evident from the foregoing discussion that while the heads of the two schools regarded academic achievement as the most important goal of a secondary education, the head at Inland High, regarded the acquisition of social goals as intimately linked to academic work. Consequently, the two school heads actualized the goals of a secondary education through different conceptions of management and activities. At Valley High School, Kazi had installed a management style that gave teachers public acknowledgement and praise for their work. Kazi had delegated the academically important administrative duties to other teachers so that he need not 'stick around' most of the school day. Kazi's conception of good school management for academic work can therefore, be said to have encompassed the concept of division of labour between himself, teachers and students. However, since he seemed to regard non-classroom administrative aspects and duties as peripheral to the central goal of academic achievement, he automatically allocated such duties without ascertaining that there would be a proper mechanism through which to assess and evaluate their goals and achievements.

At Inland High School however, Somo had a clear and elaborate conception of the goals of a secondary education which encompassed both high academic achievement as well as various social goals such that communication patterns, routines and bellwork were employed to implement these four major goals. Management duties were delegated and distributed among various personnel to economize on 'mind and energy' and some duties were assigned to students taking into account their developmental level. In this respect, intellectual developmental discontinuities and levels were carefully attended to for Juniors and Seniors in terms of leisure time and academic work load, even though attention to students' physical development in terms of allocation of manual labour, was less obvious. In addition, the seniority system with its corespondent allocation of privileges according to whether or not a student belonged to the prefectship system, all re-affirmed to students the presence of leaders in their community, while at the same time, underscoring the disproportionate availability of material resources and social status to all participants in 'community life'.

Three other concepts regarding good school management can be seen to have been further elaborated by Somo. First, the encouragement of non-expert staff to involve themselves in the 'comprehensive training' of students in sports and clubs, underscored latent conflicts between teachers and management in being asked to do work thatteachers regarded as beyond their own subject expertise. What Somo was advocating was that while teachers had to be experts in class they also had to be determined leaders outside. A second concept concerned use of common sense. Even though Somo had written no specific document to teachers on their use of common sense, he often implied that many teachers often failed to use it - necessitating persuasion, pushing, compromise and ordering around. A third concept concerned combining in a single framework, the evaluation of student academic and social achievements on a daily and term basis. This once again re-affirmed the purpose of comprehensive training and the overall goals of education that Somo saw as crucial to good school management. The next two chapters discuss how teachers perceived their roles within these management frameworks.

Chapter 2

THE ROLE OF TEACHERS IN MANAGING EDUCATION

The foregoing discussion has shown that the two school heads, Somo and Kazi, regarded teachers as key participants in various aspects of school management. At both schools, teachers were expected to share in the numerous duties of supervision in a boarding school as well as to take part in extra-curricular activities. At Inland High, the school head emphasized the need for all teachers to actually participate in all duties and responsiblities which are part of the comprehensive training program for students. At Valley High however, Kazi emphasized mainly those teacher roles that had direct bearing on the school's academic program. In this chapter, the perceptions of teachers at Inland High are discussed.

The documents written by Somo and referred to in Chapter 1, indicated that there were conflicts on the issue of teacher participation in activities of the comprehensive training program. Teachers at Inland High were easily accessible to a researcher since most of them tended to spend their non-class periods in the staffroom, and were willing to discuss openly their perceptions of the school's management. In addition, staff had a very strong tradition of attending the daily 15 minutes' tea-break where all aspects of the school were discussed and debated.

Teacher Perceptions of Style of Management

All teachers were unanimous in their belief that Somo was a very good school administrator so there were no complaints that the head was not doing enough of his own work. This does not mean that teachers did not see elements of weakness in the system but overall, they emphasized the strengths of management. They attributed much of the school's ability to run smoothly to two factors, namely; the head's participation in almost all the management duties which other school personnel were asked to undertake; and the head's recognition of the important teacher role in managing the school. The teacher evaluation of Somo's management qualities as manager, organizer and planner are given in Chart 2.

On the positive side, Somo's constant presence in the school as a model and an inspiration was valued by teachers; teaching and learning processes were well organized and co-ordinated; and teacher opinions were frequently sought on all issues. Resources were clearly allocated particularly, in terms of money available to each department to purchase items such as consumables, books, and new equipment; and there was forward planning for all activities so that teachers could sequence various activities and teaching tasks in order to meet important deadlines.

Chart 2: Inland High Teacher Evaluation of Management

Quality	Good	Poor
a) Manager	-Always present as inspirational/model -proper duty delegation -finances managed openly	-Always breathing down your neck
b) Organizer	-Seeks teachers' opinions -teaching-learning and evaluation well co-ordinated	-Too many meetings -evaluation takes much time -co-ordination based on tradition
c) Planner	-Forward looking -major activities of school and learning dealt with in good time -resource allocation clear	-Teacher's time taken up in planning for subjects and departments

On the negative side, teachers stated that there were altogether too many activities in which both the head and teachers were involved in managing, co-ordinating and planning for the whole school. Teachers' feelings about their own involvement in management are elaborated in Chart 3.

Chart 3: Inland High Teacher Involvement in Management

Positive Feelings	Negative Feeling
Teachers are assigned duties by head, so no need to make difficult decisions	Teachers cannot choose which duties to carry
Teachers do not need special qualities to do any duty well since performance is conferred by system not by individual	Little opportunity for teachers to be creative since everything runs like clockwork
Teachers have opportunity to contribute to decisions	Little opportunity to change the way things are run
Teachers can always seek guidance from head since he is always present	Constant control and supervision by head
	Constant reference to the school's traditions makes many teachers feel as strangers in the school.

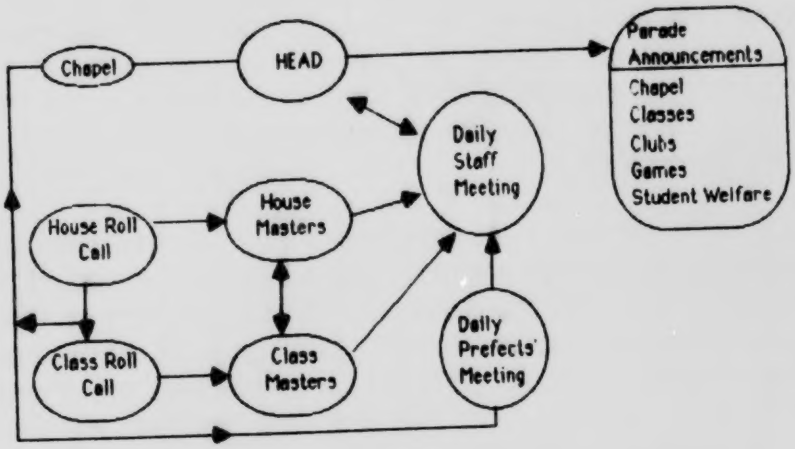
Teachers were generally ambivalent in their feelings about their role in management. For instance, 13 (30.1% of total staff) of the 42 teachers felt that it was good that the overall management system had structured everything so strictly because then individual qualities did not have to come into play in controlling, determining and evaluating individual performance of duty. However, 9 (21.4% of total staff) of the 13 described the school as "boring since nothing out of the ordinary ever happens here." Of the 29 (69.0% of total staff) teachers who felt that the comprehensive system of management was not good since it denied individual teachers the development and exercise of creativity, 11(26.2% of total staff) said that many teachers were incapable of designing workable school management activities. Similarly, while 29 (69.0% of total staff) teachers felt satisfied that they had an opportunity to contribute their opinions to various decisions made in the school, 12 (28.6% of total staff) of them felt that even though they contributed to these decisions, there was little chance of changing the way things were really done in the school. They in fact, considered their contribution to be mere window dressing.

A Diversity of Management Practices

One of the striking features of management at Inland High was the wide diversity of management practices used by the head, teachers and students on a daily basis to gather and disseminate information, regarding school personnel and activities. In other words, the structural divisions of labour among staff and students were also a communication system for both small group and whole school forums. Roll call is an example of the kind of co-ordination in which teachers were involved and serves to illustrate possible sources of teachers' complaints about "too much work". Chart 4 summarizes the main structural components, activities and the direction of flow of information in various activities relating to the roll call of either staff or students.

An informal roll call of students was first taken in their dormitories at 6.10 a.m. by the house prefects. If it was discovered that a student was sick, for example, the house master would be informed who would in turn, inform the class teacher concerned. The class teacher would in turn, inform all staff at the daily 15 minutes' morning meeting at 7.35 a.m. The house roll call also served to ensure that all housework would be done because arrangements for subsitutes for students who were sick or absent could be made. The school's prefects would meet briefly during the 35 minutes devoted to housework, and then inform the deputy head of school of any

Chart 4: Daily Roll Call and Flow of Information


Chapel
HEAD
Parade Announcements
Chapel
Classes
Clubs
Games
Student Welfare
Daily Staff Meeting
House Roll Call
House Masters
Class Roll Call
Class Masters
Daily Prefects' Meeting

important issues they wished to bring to the attention of staff. All students would then go for another roll call at 6.45 a. m., this time, conducted by the class monitor in the presence of the class teacher. This roll call gave students an opportunity to inform class-teachers about the class's progress on various assignments so that, if there were problems, the class teacher would inform staff during the morning meeting.

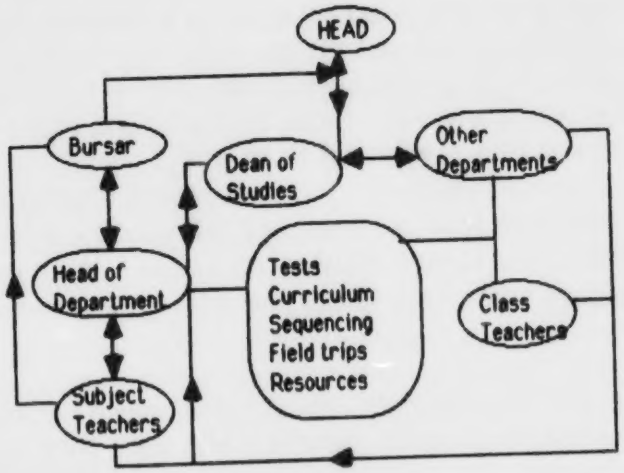
During subsequent chapel, prayers would be said for sick students and the whole school community. The school head would then proceed to the staff meeting at 7.35 a.m., where all information previously gathered by teachers and students, would be shared among the whole staff, and class teachers would answer any questions raised about specific classes. Every class teacher would list on the staff noticeboard the names of any sick students in his class, so that other teachers would know which students would be absent, who would come late for class, and who might not have done assignments and morning work due to sickness. During this meeting, staff would also inform the school deputy of any announcements they wanted to make during students' parade. In this way, the school head was informed as well as the number of speakers at parade kept to a minimum.

At 7.45 a.m. students would assemble for school roll call that preceded parade. All members of a house (selected from all six class levels) would line up together, and identify themselves as their names were read out by each senior house prefect and as the other senior house prefects inspected each student to make sure he had the correct uniform. Cases of sick students would be confirmed from the senior medical prefect's list.

Two purposes were served by the roll call. First, roll call was not simply a technique to get students to be where they were expected to be on time, but it also collected information for teachers so that they could plan their daily activities such as class work, games and housework accordingly. Second, all staff were involved in various duties such as house masters, class teachers, duty masters, and they had to be with students at all times in order to assess the accuracy of gathered information and to disseminate their findings to the rest of the staff. Therefore, the daily staff morning meeting might be regarded as a form of roll call where once again, the senior staff- the deputy head, the dean of studies and the various heads of departments- all assessed the available teaching force for the day.

Other school activities, namely, the academic program; evaluation of academic work; and students' participation in clubs and societies and games, chapel, and the school choir; each had information gathering and dissemination systems in place which were more complex than roll call, and demanded co-ordination, documentation, and presentation of results by teachers within very strict deadlines. For instance, in conducting the academic program, heads of departments had to co-ordinate with various personnel on a weekly basis in tackling issues such as tests, curriculum sequencing, field trips and resources. Chart 5 represents a typical format for the science departments.

Chart 5: Co-ordination of Academic Program in a Science Department


HEAD
Bursar
Dean of Studies
Other Departments
Head of Department
Tests
Curriculum
Sequencing
Field trips
Resources
Class Teachers
Subject Teachers

Consequently, teachers who said that there was too much co-ordination (incidentally no teacher suggested that there was too little) felt that a great deal of what the present procedures and activities achieved could be accomplished with fewer structures and less co-ordination. For instance,19 (45.2% of total staff) teachers felt that since staff met every morning, there was no need for a subsequent daily departmental meeting. Teachers pointed out that there was generally, too much pushing from the head. "There is a lot of work here. And the headmaster keeps pushing you, sometimes too much." Asked in what ways the school head pushed, a teacher replied, "By himself joining the activities. For instance, he can go to conduct games, so that you feel also that you should be working. If he, the headmaster is doing it, why not you!". One teacher explained that, "If you are a new teacher it takes time to settle in this school. There are many things that happen here that do not happen in other schools. Here you have got to get used to duty, teaching on Saturdays and the hard work here. For instance, students' practicals have to be marked each week plus all student voluntary projects especially, for those in the examination class."

However, no teacher at Inland High expressed the view that the management had skewed the school's goals in order to concentrate on either one major goal or non-school goals. All teachers felt that the wide range of extra-class activities which involved all students, contributed in fact, to students' total development of intellect and character. But ultimately, even those teachers who found the system "too much", agreed that the school head was a model, an inspiration and above all, humane. "He is very nice. He is very understanding when you have a problem. He will be honest and tell you he cannot solve it if he can't. He will tell you *Mwalimu* (teacher) I can't solve that one. But whenever you have something to say, he will listen, even if it is to criticize him".

But were teacher complaints about "too much managing, co-ordination, and planning" really genuine? And were their contribution to decisions ignored? And, was tradition so entrenched at Inland High as to prevent the introduction of change? Before attempting to answer these questions, it will be instructive to examine other teachers' perceptions of the style of management practiced at Valley High School.

Chapter 3

MANAGING BY PROXY

The goals for a secondary school education and the management style of Mr Kazi, head of Valley High School, were described in Chapter 1. First, it was pointed out that Kazi's most important goal for a secondary school education was to ensure that students achieved high academic performance in public examinations. In pursuit of this goal, Kazi constantly praised teachers for their good work and also encouraged students to match teacher efforts by studying hard. Second, it was pointed out that Kazi had delegated not only the academically important administrative duties but also other responsibilities to teachers so that the school would continue to run smoothly during his frequent and prolonged absences. What were teacher perceptions and responses to this management style?

Teacher Concepts of Management

A characteristic of teacher perceptions of school management at Valley High was the polarization of opinions between those teachers who considered management as "non-existent" and those who were not really concerned. Chart 6 summarizes teacher perceptions of the head's management qualities.

Chart 6: Valley High Teacher Perceptions of Management

Quality	Good	Poor
a) Manager	-Often absent, so does not interfere with teachers' business -stingy with money	-Frequent absence means no administration, does not know what is going on
b) Organizer	-Head plans for whole school, so teachers are free to organize academic work -head does clatter teachers' timetable. Head evaluates only academic work	-Does not organize anything so excess delegation with little work left for head -does not bother to evaluate teachers' work except teaching
c) Planner	-Has instituted many new programs into curriculum -when teachers suggest new ideas, head leaves teachers to do implementation with little interference	-Comes up with unworkable ideas and unable to develop school's physical facilities -new ideas not properly implemented, so they quickly collapse

On one hand, most teachers considered the head's constant absence from school, as a good managerial strategy since this curtailed his interference in individual teacher's work, and enabled teachers to plan work relevant to teaching, instead of spending some of the time on planning for non-class activities. Moreover, while the head instituted many new curriculum ideas and programs, he did not apparently have the habit of "taking over" ideas initiated by teachers. Instead, he left each teacher to develop ideas independently, to maturity.

On the other hand, other teachers complained about various poor aspects of the heads's management style which also centered around issues of his constant absence from school. Teachers complained that the head had excessively delegated duties so that he had no work left to do, and could therefore, absent himself from school. He was said to have little knowledge of what was really going on and therefore, could not meet such teacher needs as providing money for resources and evaluating their non-teaching work. He was said to have a narrow view of school goals so that he did not bother to assess student non-class work. The practice of "not taking over" ideas initiated by teachers was seen as a strategy in the service of the head's constant absence from school, so that teachers might do all the planning and implementation of new ideas. Teachers regarded the head's innovations in curriculum programs as unnecessary and saw absence of developement in the school's physical facilities as due to the head's lack of organizational ability and imagination. As will be discussed later, the issues of the school's physical development and new curriculum programs were sources of latent conflict between many teachers and the head. Elements of such conflict are evident from Chart 7 which summarizes teachers' positive and negative feelings with regard to their involvement in school management.

Chart 7: Valley High Teacher Involvement in Management

Positive Feelings	Negative Feelings
-Head prescribe duties loosely, so teachers with initiative can create and assume duties as desired	-Waste of time by teachers due to amalgamation of unclear duty boundaries
-If a teacher does not want to be overloaded with duties, he can refuse to give ideas	-People with good ideas who fear being overloaded decide to remain quiet
-Teachers and students can ignore non-academic duties without reprimand	-Teachers can escape duty by deliberate inefficiency
-If a teacher is a fighter, he will get enough reources for his subject	-Teachers made to feel helpless by lobbying and unfair allocation of resources
-A teacher can focus all his attention on academic work	-Teachers are really unsure of students' discipline since all development of social aspects is ignored

It is clear that many of the positive feelings teachers had about their involvement in school management were in fact, due either to non-involvement or diminished involvement or negligence of duties assigned to them. Of 25 (65.8% of total staff) teachers interviewed, only 12 (31.6%of total staff) teachers consistently expressed negative feelings. This is not to say that the majority of teachers saw the head as a skilled administrator. On the contrary, 24 of the 25 teachers interviewed stated that the head was a "bad headmaster". But in analyzing their involvement in management, only half of the teachers expressed negative feelings. Why?

The teachers who expressed negative feelings tended to view the goals of schooling as a process for achieving academic and social objectives while other teachers, just like the head, focused only on the academic goals of schooling. A characteristic of teacher duties at Valley High was that each teacher more or less defined his duties, making it extremely hard to co-ordinate communication and action. Similarly, although at least 51 students were involved in school management, with the exception of the school captain and his deputy, the food prefect and the various sports prefects, the duties of other prefects were amorphous and easily ignored. For example, roll call which at Inland High had been observed to serve various purposes, at Valley High was merely a job for students who were class monitors. Once roll call was completed at the beginning of the first lesson of the day, the monitor might report his findings to the class-teacher. If the class-teacher wished, he might report any sick students to the duty master. But if none of these actions were taken many teachers would neither take notice nor complain.

If an activity enabled academic work to be done, even if its original intentions had been to support another goal, many teachers generally, minimized the effect of non-achievement of the original goal. The manner in which the Boys Development Program (BPD) and school sports were conducted, clearly illustrated most teachers' emphasis on academic work, to the total exclusion of other schooling goals. The original goal of BPD was to use increasing physical strength of students and academic knowledge in biology, agriculture, industrial education and other formal subjects, in order to improve their physical environment. The school head instructed that:

1. All teachers resident on the school campus (20 out of 38) were to participate in the program so that they could teach and demonstrate to students manual skills useful in daily living.

2. The extensive school land and grounds were to be utilized by setting up income generating activities such as poultry keeping, pig rearing, cattle keeping; and other activities such as clearing bushes, planting tree-nurseries, planting trees and planting and watering flower beds and gardens.

3. On two evenings every week, (5.00 p.m. to 6.00 p.m.), students would be

> assigned to various groups to work on one of these activities. Assignment was to be rotational through all activities by each student, every term.

The success of the program depended on proper co-ordination of all groups and availability of tools and materials. Animals had been acquired as well as some basic equipment and seedlings for the tree nurseries. At Valley High, there was a long standing rule which required every new student to bring with him a hoe and a grass slasher or *Jembe*. When this research began in late 1982, the BDP was, according to one teacher, "limping badly". By mid 1984, according to the same teacher, "it has more or less bled to death". All teachers agreed that the BDP had suffered from poor co-ordination and lack of tools and equipment. Asked what effect the collapse of the program would have on the school's goals, teachers gave various reactions, typical examples of which are given by the four responses from teachers of history, physics, biology and language respectively:

1. "Quite honestly, I think it is too much to expect me to deal with chickens with authority when I really know nothing about it. I think it is one thing to teach students the daily applications of concepts they learn in class, and another thing to expect us all to run around the whole compound demonstrating to students how history, mathematics, geography, religion apply to raising chickens."

2. "Ah, there is no problem. The boys are not doing those nonsensical activities. They are using the time much more wisely. They are reading what they know they will need for their exams."

3. "The idea was an exaggerated farce in the first place. I am glad we are back where our students' energy should be, in academics and sport. That I have no quarrel with."

4. "May be the students will not learn how to do some of these things. But I always wonder whether if a student was interested enough, he wouldn't find out the right way of doing something anyway! Anyway, I happen to think that we should concentrate on what we know how to do best here and let others to do their part."

The following response was given by one of the 12 teachers who had expressed negative feeling about their involvement in school management.

> "Of course the program has failed. The chap we educate here should be able to see how school puts into practice what it preaches. The two things are different and they should be done at different times but in the same environment. Of course, now that we don't have the tools there is nothing we can do. But that does not mean that the idea is wrong."

There were at least, five factors causing conflict among teachers with regard to the BDP. First, some teachers felt that they were not qualified to undertake the various activities in the program. But underlying this factor was the feeling that a number of these activities were not the work of teachers, "...it is one thing to teach the application of concepts to daily life, its another to expect us all run around the whole compound demonstrating...how...history applies to raising chicken." Second, some teachers felt that the BDP activity had taken up time which would be better used for academic learning. As a result, in failing to carry out BDP activities, teachers felt that students had correctly used the time to read. Teachers felt relieved that the irrelevant detour was over since students' concentration was back on academic work and sports. Third, it was quite evident that the rationale for instituting the program had not been accepted by all teachers, some of whom regarded it as " an exaggerated farce in the first place". Fourth, some teachers implied that by its failure to bring co-ordination to the program and to provide the tools for the various activities, school management had finally seen the light, and allowed teachers and students to concentrate on the important academic work.

However, other teachers thought exactly the opposite, believing that the program was relevant to education and that school was the right environment for these sorts of activities, precisely, because that's where "they are preached". This latter group saw the collapse of the program as yet another example in a series of events all of which were evidence of management's ineptitude to plan, co-ordinate and support an idea of importance. As one of these teachers stated, "If you come up with a good idea like that, the next thing to do is to be sure that you can plan for it. As it is here, we simply matched student's names to those of teachers, pinned the list on the board and left the rest of the program to take its desired course."

Fifth, some teachers had not been initially convinced that the BPD would succeed, where similar programs had previously failed and unfortunately, subsequent events and the self-fulfilling prophecies by the same teachers, had proved the critics of the program correct. The collapse of the program was unfortunate - because apparently, students were interested in the program and had not initially viewed it as "out of place" in a school's academic environment. One teacher had explained:

> "The first, second and third time you can go and meet the boys, initially, they show interest. But since there are no tools, soon they lose the interest, because it seems like a waste of time going to the various locations. Progressively, the students develop the attitude where they in fact, come to see the lack of *Jembes* and footballs, and watering cans as a positive thing. Because then, they can go and read or revise their academic work. By the fourth time, you are tired of explaining to students the lack of equipment. On the fifth time, you feel relieved when students don't show up at all."

The example of the BDP showed that teachers and students had recast and refocused other school goals in the light of the most desirable goal - academic achievement. Even dissenting teachers admitted that high academic achievement was "the only way to make it here". Consequently, if management action resulted in the support of progress towards achieving academic goals, even if that had not been its original intention, then the majority of teachers supported that action. Teachers agreed that the lack of proper co-ordination had contributed to the collapse of the BPD program. But few disapproved of the fact that failure of the program had "spared lost time" which enabled students to undertake academic work.

Devolution and Assumption of Duties

As shown in Chart 6, teachers could either be assigned duties by the head, they could ask the head for a specific duty or they could create and assume a particular duty. The manner in which duties were assigned presented another source of conflict between the head and teachers and among teachers. The loosely prescribed duties had led to a situation where the boundaries and descriptions of various duties were poorly defined leading in turn, to either a teacher ignoring his duty or taking on activities belonging to other duties, and combining them, in an effort to redefine his duty. Chart 8 contrasts the official duties of various school personnel as stated in the schools' regulations and what was actually done by personnel in performing various duties.

Chart 8: Activities and Functions in Various School Duties
(Duties Ignored are Italicized)

Official Functions	Actual Functions
School Head: Overall manager; *managing external affairs*; administer finances; *deal with all school discipline*	Administer finances; deal only with suspension of students from school
Deputy School Head: Internal management; *timetabling*; *examinations*; *collection of schemes of work*; *students' counselling on academic work*	Management of school's external affairs; deal with major students' discipline problems except suspension
Academic Dean: Interpreting for students regulations for public examinations; keeping students' academic records	Interpreting examination regulations; keeping students' academic records; academic counselling; timetabling; devising and compiling all students' records; compiling all schemes of work; examinations; internal management
Career Master: *Devising and compiling students' academic and social records*; *career counselling; helping students to know about higher education institutions*	Distribute to students forms for application for admission to higher education
Deans of Discipline: *Deal with all class discipline problems beyond individual teacher's authority*	Checking students' uniform

Continued

Official Functions	Actual Functions
Committee for BDP: Organize, *co-ordinate and implement program; manage school grounds*	Make list of teachers and students in each group; assign activities and put on noticeboards; assign supervision of groups
Duty Master: *Supervise prep time, and morning chores*	Sit in staffroom and check on students only when problem is reported
Teachers : *Deal with minor discipline problems during class*	Send all discipline problems to deputy head of school

It is evident that while the deputy head of school and the academic dean had re-allocated to themselves a number of other staff duties, the other teachers had ignored several aspects of their duties. Three consequences of this re-allocation of duties by individual staff were observed. First, teachers who felt strongly that their role in the school extended beyond classroom teaching became overburned with duties. The extreme cases were the academic dean and deputy head of school who together bore the largest proportion of school duties. Second, there was no overall mechanism through which all structural units, responsibilities and duties could be channeled to organize both communication and action toward a common goal. Third, the exceptional efficiency of the academic dean, who had served in the school for over 10 years, and the non-rotation of teachers' duties had led the majority of teachers to believe that the school head was dispensable; that duty co-ordination was unimportant; that the single minded concentration of both teachers and students should be on academic work; and that all other school goals can almost totally be disregarded.

Yet the co-ordination of all duties and responsibilities would not have been impossible because two different but efficient models of both action and communication actually existed in the school, namely, in the food department and in the academic program. In the former, the co-ordination mechanism ensured that funds were always available for the purchase of food; that complaints about food from the student body would be passed on to the food committee, the food prefect, the caterers, the bursar, the deputy head and the head and would be dealtwith promptly; and that food substitutes desired by students, within reason, would always be provided. Attention to the food department is given in all schools, since it is generally believed that students' dissatisfaction with food (and uniforms) are frequent precipitants of strikes At Valley High, however, there seemed to be an extremely efficient school-wide mechanism to deal with the issue

Work of the Academic Dean

How did the school co-ordinate the academic program so that students could consistently achieve high performance on public examinations, particularly in view of the fact that at Valley High, all physical, material and learning resources were scarce, and those that existed continued to deteriorate throughout the research project? Even though the school head was frequently absent from school, he was very aware that his school was performing well and that it had in fact improved tremendously since 1976. Teachers had explained that this dramatic improvement in achievement had generally coincided with the appointment of the current academic dean, which also had coincided, in the opinion of most teachers, with the beginning of the physical deterioration of the school plant. It appears that when the academic dean had been appointed, he had prescribed for himself duties that he thought necessary to his task. Specifically, he had set up a system which included six elements:

1. A record keeping system of students' term achievements.

2. A report card that not only showed the marks obtained by each student in each subject, but also had serious and factual comments from each subject teacher, the class teacher and a comment about overall performance by the academic dean.

3. A system whereby students' report cards were "tailed" and "bottomed" -putting in names, age, class, etc. - early during the term to ease the time burden on subject and class teachers at the

end of each term, a burden the dean thought discouraged teachers from making useful and analytic comments on each report in order to give students meaningful feedback.

4. A mechanism to interpret the public examinations' regulations, right from form 1, regarding what requirements students had to meet in order to obtain a first class certificate at form 4, and what combination of subjects were offered at "A" level in most good schools and what combination of subjects students would need to study in order to enter into various professional and degree programs.

5. A personal effort to know each and every student. In turn, students had learned that the academic dean was a fountain of ideas, advice and encouragement. The net result was that he became the major counsellor of all students on academic matters and discipline in so far as this related to academic achievement. Moreover, the dean constantly gave teachers feedback about student academic needs so that teachers regarded him as a useful source of advice.

6. A mechanism to co-ordinate some of the school' s mock examinations with other good schools in the country.

It would appear, that in the belief that the evaluative and record keeping infrasturcture supportive of academic goals had been properly organized by the dean, the school head and teachers had decided not to tamper with the system. Instead, they supported and augmented the system by their committment to academic work. They undertook four main activities namely: submitting regularly to the dean, all class tests' results; improvising as much as possible students' reading and class practical work; debating as ften as possible among themselves (particularly, among teachers of the same subject), on how to teach and evaluate various sections of the syllabus; and generally, using available time to improvise learning resources and prepare lessons. In this manner, academic work was effeciently organized and co-ordinated. It is however, instructive to study an example of an area where there was severe lack of co-ordination because it underscores, perhaps definitively, the high price of management by proxy.

Of Chairs and Desks

As stated earlier, the appointment of the academic dean in 1976 was generally regarded by teachers to have coincided with the beginning of the physical deterioration of the school plant. The teacher who was academic dean during this research, had been responsible for school furniture prior to 1976, and had also assigned himself the duty of plant supervisor. For instance, he had devised a system where each desk and chair was not only marked with the name of the school but also numbered. The teacher maintained a record of the number of the chair and desk assigned to each student. Whenever a chair was broken, he asked the student for an explanation of the breakage. If he was satisfied that the chair had been broken accidentally, the school would pay for the repair. If he ascertained that the student had been careless, the cost of repair would be charged to the student. When the teacher became academic dean, a new system was implemented, namely, no one was responsible for school furniture.

The general condition of furniture at Valley High was an instructive example of the school's physical deterioration. During the research period, an inventory of furniture in the staffroom, two biology laboratories and one classroom was conducted on three occasions in March 1983, June 1984 and November 1984. It was possible to obtain an estimate of the number of chairs and desks in each of the rooms in 1976. The student desk and chair were each made of a metal frame with a wooden top or seat. Whenever a desk or chair broke, normally the top or seat might disappear, but the metal frame would be stacked at the back of each classroom in the hope of repair at some future date. It was therefore possible to count the broken furniture over time. Table 2 shows the results of this inventory.

Table 2: The State of Furniture at Valley High School

Furniture 1976	Good	Poor	Broken	Date
Desks - 40	26	8	6	March 1983
	21	9	10	June 1984
	8	19	13	Nov 1984
Chairs- 40	21	12	7	March 1983
	15	15	10	June 1984
	12	15	13	Nov 1984*
Lab -80	48	3	3	March 1983
Stools	24	14	18	June 1984
	17	24	16	Nov 1984

* By the end of the research in May 1985, 2 students in form 1 were sharing each desk, most sat on cardboard pieces or other improvised wooden pieces and often slid off these and fell during lessons causing laughter.

Observing students, on Saturdays, washing floors of classrooms and moving furniture around was a dramatic lesson on how to leave a school without classroom furniture. Essentially two or three students would be responsible for washing a classroom floor. They would lift the desks out of the classroom and pile them, one on top of the other, on the grass outside. They wold then throw the chairs out, piling them on top of the desks. (Incidentally one of the reasons for throwing the chairs from the doorway to the grass was because another set of boys would be 'washing' -in reality splashing water- the verandah and this group would not allow anyone to walk across the verandah before it was dry.) The students who were cleaning the classroom floor would then splash water, without soap, all over the floor- not too much otherwise, they would have to scoop it up with their hands or wait the whole day for it to dry, since there were no mops - and then swept the water around the whole area, using a broom made of leaves. This done, they would throw the furniture back into the room -- never mind where it landed. The whole operation lasted no more than 10 minutes. Meanwhile, the teacher on duty would be seated in the staffroom marking students' exercise books.

Physical deterioration was observed in almost all other school facilities. For instance, the grass on the compound was rarely cut, many of the glass windows were broken, the roof of the dining hall leaked, lockers had no doors, many machines in the workshop needed major repairs and laboratories were permeated by an excruciating stench emanating from the rabbits and rats bred in cages and kept inside the laboratory - a practice contrary to regulations that require these animal cages to be outside the laboratory. Students often presented a spectacle of uniform transformations - having used all colours of buttons on originally white shirts, an assortment of blue sweaters with holes from cuff to elbow, all manner and colour of shoes, and unhemmed shorts and trousers. Yet all these irregularities were strictly forbidden by a notice dated 1975 which hung on three major public noticeboards.

What were teachers reactions to this physical deterioration? A teacher with a characteristic and eloquent sense of caustic humour, summarized his sentiments on the issue this way:

> "You will be dismayed if I tell you that we don't actually see ourselves as all that untidy. In all history, familiarity has always bred contempt. But here, it only breeds untidiness".

Almost all teachers explained that they ignored 'these minor problems'. Asked whether or not they had brought the broken furniture to the head's attention, a teacher replied,

> "This is not a problem that has come up this year. Last year it was the same. The year before that it was the same story. You reach a stage where you define your individual goals. The solution is simple. You sit down and do your work. You are officially here to teach so you concentrate on teaching and forget about the rest. Fortunately, here the boys will not let you down in class. That is the consolation."

Teachers who had expressed dismay about the school's disregard of the social goals in educating boys, all had similar sentiments and none of them wanted to transfer out of the school. Summarizing what seemed to be the general belief among all teachers, a mathematics teacher said,

> "You see there are some teachers here who think the headmaster is very good. He does not appear that often. He doesn't interfere into your business of teaching. This gives a certain degree of liberalism to each teacher to plan and teach the way he wishes. Even those of us who feel that the headmaster found everything here but he has failed to maintain it, admit that much of what we see is not affecting us directly- like lack of hoes, lack of game facilities, the tall grass around, the dirty compound, students with unkempt hair and lost buttons on shirts- such things do not affect us that much, as long as we have a certain type of student who is easily motivated. When you consider all that, you think twice before you ask for a transfer. You say, let me hang on. Let me continue working hard, one day we will get somebody whom we give ideas and he is ready to work - if we are lucky".

The teachers' fine tuning of both personal and the school's goals was highly dependent on the school's capacity to attract a certain type of student. Valley High, as one of the few national schools, had no problem in getting such a student. And even though the recently implemented quota system of selecting students from all districts of Kenya to such schools had brought in a few students with less than the best possible grade, teachers were not worried. They regarded such students as a challenge which would force adapt to adapt their teaching methods. Teachers therefore, continued to focus their attention on academic work and classroom teaching in disregard of other goals. Probably summarizing the whole school's sentiments, the academic dean had said,

> "A long time ago, we asked ourselves the question: Which is better - beauty or academic achievement? We voted academic."

Summary

This chapter has presented data from Valley High in order to provide background for tackling questions posed at the end of Chapter 2 regarding complaints by teachers at Inland High, of too much co-ordination. Data from Valley High has suggested that: first, even though official co-ordination was absent with regard to many non-academic activities, co-ordination of academic work, although originally implemented by one teacher, had in fact been institutionalized and was recognized to be an integral part of the school's total academic program. Second, because co-ordination was carried out by only a few staff members, these teachers felt overburdened in comparison to the rest of the staff. Third, lack of co-ordination in other aspects of the school's life appeared to have resulted in a narrowing of the goals of a secondary education and to have encouraged the deterioration of the physical facilities that supported academic work. Fourth, it would appear that disregard of the social goals in the school had so blunted both teachers' and students desire to work and live in an improved environment that the majority had ceased not only to care, but also to believe that such an environment was necessary. In the following chapter, the complaints of teachers from the two schools are contrasted in an attempt to assess their validity within the context of each school.

Chapter 4

FREEDOM AND CONTROL IN SCHOOL ENVIRONMENTS

Presented in this chapter are data on teacher beliefs and perceptions in an attempt to identify the basis for teacher complaints about their involvement in various aspects of school management. For instance: what lay behind assertions by teachers at Valley High that: the school runs better in the absence of the school head than in his presence; and that if the head of school been constantly present in the school, there would have been chaos? And how valid was the claim by teachers at Inland High, that their contribution to decisions was totally ignored? And was tradition so entrenched at Inland High as to prevent the introduction of change?

Teacher Expectations and Control

Teacher complaints about the above mentioned factors were probably evidence of inherent contradictions between the school goals and the means prescribed to achieve such goals. But such complaints and contradictions were also inherent in the goals of the total educational sytem beyond particular schools. Ultimately, teachercomplaints concerned the degree to which teachers felt that they had control over their work environment in its totality. Summaries of teachers' positive and negative feelings about their involvement in management revealed that on one hand, teachers at Inland High, were concerned about a head who constantly breathed down their necks; left them little individual liberty to plan their curriculums; conscripted teachers for extra-curricular activities during their so-called free time; required them to be experts in all aspects of school life; and demanded that they be leaders, managers, organizers and planners, when teachers would have preferred to be lead, managed, organized and given ready made plans. On the other hand, some teachers at Valley High were concerned about an absentee head who seemed to manage by proxy. What did teacher perceptions reveal about their control of the environments in which they worked? And what did this control imply in terms of achievement of the school goals?

At Inland High, there was a group of teachers who saw the head's constant presence and supervision of all school activity, as overbearing, and as a mechanism to impose control over teachers both through the direct instrument of stated rules of action, and by a subtle form of coercion through "modelling". This, many teachers had pointed out, significantly reduced their freedom and made them feel like "mere seniors to the students". Moreover, since teachers had to work within a comprehensively co-ordinated system, many felt that their own creativity and personal growth had been stunted by their inability to try out new ideas and learn from their own mistakes.

Yet for all teachers at Inland High, the idea of a head of school who would be frequently absent from school was unthinkable. This was beautifully dramatized when Somo was transferred from the school at the end of 1984. When the new head arrived, he spent a great deal of time in his office and rarely participated in the traditional tea break which Somo had made a daily ritual. One teacher thought the new head had absented himself too often from school and commented,

> "Even though he can't change much here, if he does not pull himself from his desk, we are going to have chaos. He does not attend tea. He is timid. He does not teach, and he uses the slightest opportunity to run away from the school. That's not what Inland High needs. We need a headmaster who is there, on a day to day basis".

If teachers had really felt controlled by the former head's constant presence in the school and his participation in all activities, why did they feel that the school's stability was threatened by a new head's frequent absence and non-participation in some of traditional school activity, particularly since they believed that the new head would not be able to change much in the school? The reasons would seem to be suggested by teachers' feeling about the same issue at Valley High.

At Valley High, a few teachers regarded *any* head's constant absence from a school as detrimental. But even these few teachers agreed with the rest of the staff, that in the case of Mr. Kazi, constant absence was, in the final analysis, not as detrimental to the smooth running of the school as his occasional presence. Kazi's constant absence was perceived as good precisely because it provided opportunity for teachers to plan, to concentrate on academic issues and to deal with student discipline. The head's absence was good because it increased each teacher's control over the management, organization and planning of his individual academic work - something that teachers at Inland High said they were denied. The head's constant absence at Valley High still left all teachers in full control of the two elements they considered crucial in school life, the academic content and student discipline in class, even though in reality, they did little about the latter. In this situation, both those teachers who saw the head's constant absence as good and those who saw it as bad, did not feel controlled. In the final analysis, even those teachers who believed that it was professionally wrong for a head to be away from school for long periods, conceded that for this particular school head, absence was a more tolerable crime than constant presence.

But as earlier explained, Mr Kazi did little co-ordination of activity whenever he was in school. He simply praised the good work of teachers. Why did teachers desire his total absence from school? Put differently, why did the teachers of two schools of high academic performance feel exactly the opposite about the constant presence of the head in the school on a daily basis? The answer lay in what the two heads actually did when they were in school.

At Valley High, the head was regarded by teachers as a de-stabilizing factor in the smooth operation of the school because of at least, five reasons. First, the head was not generally considered an efficient administrator by teachers. He was said to be an inept co-ordinator; his advise was rarely sought; and whenever he gave such advice, it often turned out to be unworkable. The head was also said to be a very poor judge of people. He apparently, put too much trust in people and wanted to give each person a chance to redeem himself, with the result that he rarely apportioned blame to anyone, not even to himself. At Valley High, where there were amorphous boundaries between responsibilities and duties, it was already sufficiently difficult to find anyone to blame if something did not work out. This situation was worsened further by the head's inability to personally take responsibility to blame anyone, even in those cases where he was definite of the identity of the culprits. Therefore, teachers considered him indecisive and regarded such indecisiveness as due to a desire for undeserved reciprocity from teachers. The head therefore was not regarded as a model and an inspiration, supportive of daily action.

Second, although the head taught, he had only a very small number of Form 6 students (5-8 students out of a total population of 450) and his humanities subject was considered to be insignificant in a science oriented school. He was believed to have little knowledge of the dynamics and problems of large junior classes, where resources were scarce. In discussing the head's inability to provide resources for teaching large classes, a teacher had stated:

> "Two months ago I went in for the 3rd time to ask for a little money to buy tape to repair books, I got nothing. Two weeks ago, I told him we need new texts, he said nothing. Today I went in there to tell him all the textbooks are torn, but he suggested that students should share. If he taught a large class, he would know about the impossibility of sharing books which are already in tatters".

Third, the head was said to regularly come up with unworkable curriculum innovations. A teacher had pointed out,

> "I don't know what it is, but quite often this character [the head] gets this bizarre urge, it is a ritual I think, which satisfies some deep personal appetite to be known. He insists on starting something which everyone else knows will not work for long. When he next appears, he will definitely start something which will not get finished before he takes off once again."

The Boys Development Program discussed earlier, the Fuel Studies Course, the Literary Masters Course and Mathematics for Everyday Use, were examples of such curriculum innovations all of which had more or less collapsed by the end of the research period. Teachers' concern about the head's innovative curriculum ideas actually involved issues of scarcity of learning resources at two levels. In the first instance, new programs diverted large amounts of resources from other areas of academic work which were already operating with minimal resources. In the second instance, new programs always created very difficult, almost intractable problems in scheduling, often entailing reduction in the time used to learn other subjects such as language and mathematics. Teachers were strongly opposed to reducing time for these two subjects since their long term effects would be a reduction in the number of first division certificates among students. A teacher stated,

> "When he appears, I am apprehensive because my time may be cut in order to teach some fancy course which is totally useless."

Fourth, because the head was so constantly absent from school, whenever he appeared, teachers were lured into a temporary belief that he might be able to solve some of the school's problems. For example, concerning the availability of resources, a teacher explained,

> "When they see him, teachers begin to feel that they may make a better case this time. You see, they have failed to learn that they only often waste their time queueing to see the headmaster to provide money. I don't think the money is there. But his sudden over-abundance creates an expectation of abundance of money and ideas".

Fifth, since the carrying out of major punishments of students, such as caning, were reserved for the head of the school, teachers said that they noticed that students appeared to be generally unsettled and distracted whenever the head suddenly appeared after a long absence. Indeed, the head would often execute such punishments at the earliest opportunity, causing commotion in classes as culprits were called out, and subsequently returned with sullen faces.

Because of these reasons, teachers could assert that,

> "Here you do not feel the absence of the headmaster, there is nothing you are hoping for from him. In fact you sometimes pray that he will not show up. Even when the deputy is not here as well, the only thing that happens is that both are not in. That's all."

At Inland High, a different set of beliefs about the role of the head in controlling teachers' working environment operated. The head was regarded not only as the central manager, organizer and planner but also as a major stabilizing factor in the school. He was seen as an able administrator, co-ordinator, advisor, and a believable model as a classroom teacher. The head taught an important subject in the curriculum, for a reasonable number of hours a week, at the lower school. Therefore, teachers trusted his assessment, criticism and advice of whatever issues may be discussed in regard to the teaching-learning process. And since he was always in the school, and participated in all school activities, teachers regarded him as one of themselves. Somo had created and maintained a belief in the indispensability of his roles among staff in almost every aspect of school life. Even though he had delegated the day to day overseeing of academic matters, discipline, social welfare and evaluation to other personnel, everyone knew that the head was the final arbiter.

Moreover, Somo's information gathering and dissemination strategies, and his constant presence had secured credibility not just for the man, but also for the position he held. Somo's personality and position and the functions attached to it, had secured a strong moral commitment from a large percentage of staff to the academic and social framework of the school with the attendant belief that as long as this organizational framework was upheld and commanded loyalty of its participants, nothing, including academic achievement, would change. Therefore, even those teachers at Inland High, who felt controlled by the head's constant presence, appreciated the fact that his constant absence would have created an administrative vacuum in which discipline, teaching, learning and other school activities might not have been properly managed, organized, co-ordinated or planned.

And here lay the basis of the contradictions in the teacher complaints. Although teachers yearned for an opportunity to carry out individual planning, to be creative and to learn from their mistakes, they simultaneously, realized that lack of a school-wide mechanism of co-ordination, would have increased individual teacher's responsibilities for management, organization, and planning of school-wide activities. But teachers also believed that comprehensive co-ordination of academic and social programs were, to a high degree, responsible for the school's maintainance of high academic performance, and they were unprepared to see achievement slide. Teachers regarded the head's activities as mostly supportive of this goal. Therefore, when a new head arrived, whose initial actions seemed not to uphold, at least, some components of the academic and social organizational framework which many teachers considered absolutely essential, there was fear among staff that the system was in danger of losing support and consequently, changing the beliefs of the participants. Teachers seemed to believe that once the beliefs changed, academic excellence would suffer.

Personality and Tradition

What emerges from the above discussion is the crucial importance of the personality of each of the school heads. Although recent research would seem to have discarded the "great man" theory of leadership by adopting perspectives from situational leadership theory (Marshall 1984), it was evident from the two schools that interactions among school personnel rested on some guiding principle set by either the school head or someone else. As the case of the academic dean at Valley High showed, such a guiding principle need not be initiated by the officially recognized leader. What really mattered was the initiator's commitment to the principle and his ability to persuade others to adhere to it.

It was perhaps interesting that both heads of school at Inland High and Valley High were very committed Christians, presiding over Christian schools. Some of their responses to their jobs and roles could be traced to how they interpreted the mission of Christianity within their specific school environments and beyond. As Smith et al. (1984) have pointed out, while research literature may chose to ignore the topic of religion, it was observed that for Somo and Inland High, just as Smith et al. had observed at Kensington, religious experiences and beliefs heavily influenced their motives, structures and actions. Inland High was a very Christian school in all traditions so that Somo's own beliefs fitted well into these traditions.

> "I have been in school administration for over 20 years. I have found that the best thing is to be clear about your own goals and expectations and then work to

achieve them, with the help of God".

Somo had explained that he had always based his goals and expectations on principles of community living, integrity, hard work and clear objectives, all of which were unlikely to be prejudicial to other people's goals and expectations.

Somo stressed that the Christian principles upon which his own life rested, and upon which daily chapel for students was based, supported the administrative concept of community living. The 15 minutes of chapel, which he said he attended and always enjoyed, served as a daily rededication of students' work to God. Re-dedication of the school's work to God was a theme in many group forums throughout the year and always culminated in Special School Day (SSD) which commemorated the founding of the school. More than during any other event, on SSD the school sought to unite the founders, old boys and the current student body into a "renewed foundation upon which we continue to build."

During the SSD service in 1984, six hymns: "O God Our Help in Ages Past; Our Hope for Years to Come."; "Come by here my Lord, come by here,"; "When I Survey the Wonderous Cross"; "Lord for Thy Tender Mercies, Remember Not Our Past, so That We May Walk With a Perfect Heart" and Psalm 150; and the school's own song were selected. The subjects and content of speeches and sermons were similarly, tailored: The prayer from an old student was based on the theme, "The secret of our success is our dependence on You (God) our resource and strength."; Another old student prayed on the theme, "In loving our neighbours, in our midst is God", The sermon given by another old student was termed "Lest we forget", in which he recounted how the christian principles of community living had helped successive generations of students of the school to become educated in order to give outstanding service to the nation. Therefore, through an event designed to unite the founders, old boys and the current student body, students had a chance to reflect on how past students had fulfilled the school's goals of educating the elite who had become a foundation upon which the nation continued to build.

Somo had explained that the Christian traditions in the school were not simply a ruse designed to implant some imaginary fears in students' minds. Somo believed that the traditions had been the foundation of the school's academic success over the years and through the Christian spirit of sharing and service to all, friends and old boys of the school had assisted with the provision of learning resources. In addition, the long record of high academic achievement that had flourished within these traditions, plus the general belief that only intelligent boys were admitted to the school, had helped sustain an intellectual and social climate of high expectations and a hard work ethic which in turn, sustained high academic achievement.

Inland High had enormous social recognition which automatically transferred to its head, teachers and students. The community of the school was alive infused with Somo's tremendous energy which seemed to make him be in all places, at the same time. Somo told teachers that for all they did in training young men, there was no tangible reward except personal, inner satisfaction:

> "Unfortunately, for all that comprehensive training there is no tangible satisfactory reward except that of having produced 'A better' citizen for Kenya".

After Somo had moved from the school in1985 to his new unsolicited executive job, he had said, "I miss the boys". Somo said that he had found a great deal of personal satisfaction in being with "the boys" and that his participation in games, clubs, prayers, on the farm and in supervision of housework were for him, not just an example to others, but something he believed would bring him closer to the boys.

At Valley High, Kazi presided over a school which had originally been founded on very strong and somewhat dogmatic Christian principles. With the dawn of the country's independence in 1963, the school's sponsorship had been transferred from the church to the state, and the school had been specifically encouraged to develop toward becoming a center of excellence in the teaching and learning of the sciences. Although the church had retained a tenuous and ambiguous role in the management of the school, the overall result had been that the original Christian principles had increasingly become blurred and finally non-functional in the daily life of the school. However, Kazi's Christian principles had been approved by all concerned before his appointment as head of the school. A teacher in the school had pointed out that when Kazi first came to school, "...he found everything here, but he has failed to maintain it..." To some extent, what had happened to the strong and dogmatic Christian principles may be said to have extended to the social and physical environment of the school. Yet as earlier discussed, academic achievement did not seem to have suffered the same fate. In both cases however, it was the nature of the personality of the head at Inland High, and the academic dean at Valley High that made such achievement possible.

There was evidence that Kazi had himself been brought up within the strong dogmatic principles of a Christian tradition which might account for some of his behaviour such as a desire to give every person a chance to redeem himself, a need to reciprocate favours, to know the right people, indecisiveness and putting too much faith in the ability of individuals to do the right thing. These characteristics, coupled with lack of time to personally inspect the school on a regular basis, lay at the root of the visible physical chaos of the school plant. Kazi was very much aware of such problems; that was why he had spent school funds, for example, to employ workers to clean student toilets; to repair furniture; and to trim grass on the school grounds. But his reluctance in enforcing the mechanisms that would have resulted in implementing action in these and several other areas of school life, lay in his perceived and fine tuned goals for the school and his lack of a concrete personal philosophy to work. As one teacher explained,

> "He is a man of the times. If it is politics this week, he will be there. If it is his favourite church's fund raising day, he will appear on TV. If it is some important person passing through here, he will be at the school."

Translation to the Classroom

How did teachers translate these various perceptions, conditions and situations to classroom processes? At Valley High, teachers in the biology department for example, were quite oblivious to the deterioration of the physical facilities. They taught every day in a laboratory with the dizzying stench from the rabbits and rats without any attempt to enforce the cleaning routines by subordinate staff. Teachers seemed undeterred that because many of the laboratory stools were broken, students were forced either to sit on top of desks while writing or write while standing. Teachers had explained that they had attempted once, to get laboratory stools repaired but nothing had been done. They had neither tried to see the repairmen themselves nor tried to arrange to have some of repairs done as an industrial education classroom assignment. They explained that they were not responsible for furniture. All teachers had indicated that they hated complaining and blaming other people since, "... the situation is not so bad. There are schools which are worse off". This seemed to be the opinion of the majority of teachers.

Valley High had clear national recognition as a very good school and such recognition was proudly felt and often verbalized by teachers, students and old boys. The academic dean had summarized the situation thus:

> "We have been lucky and teachers and the boys have always worked hard. Our results have been very good over the years. But now I think we have been improvising for far too long; to the extent that we can no longer afford to improvise. We have got to a point - at least, I think we are almost there - where we will be shocked that there is no more academic improvement regardless of how many handouts and individual students' projects we quietly supervise. Soon we shall have to first improve our social life in this school before academic achievement goes up any further."

During this research project, there seemed little effect of all this on classroom work. Only time will determine how valid the academic dean's statement is.

Unlike Valley High, where teachers had to scrounge for resources and support, the traditions at Inland High probably spoiled teachers by providing all needed resources and of course, by caring for all resources properly. In the classroom, tradition demanded that teachers be challenging, work hard and push their students to their uppermost academic limit, and cater as much as possible to individual student needs. Subject teachers were pushed to ensure that students in their classes did not turn out to be the failures on school-wide designed tests. Student performance in one class in a particular subject was debated by the whole staff and if remedial work was needed, there was a system to implement and assess such action. To an extent however, tradition at Inland High had unwittingly convinced some teachers that without the intricate co-ordination that currently existed, the school system would somehow "run itself". What some teachers advocated was basically an abandonment of many of the co-ordination activities during which individual accountability at each and every level of operation, including the classroom, was demanded and whereby information was collected and disseminated school-wide.

Teachers proudly pointed out, often enough, that one of the fundamental values of the traditions at Inland High, was that students were taught to have a clear notion of when it was proper for them to be heard- in the classroom, during debate, at games, in drama, in music, and cross-country - and when they were expected to simply obey. The tradition dictated that the social aspects of the environment had to be very clearly defined and demarcated so that none of the behaviour demanded of students in academic settings would be unwittingly transferred to social contexts where different levels of social learning occurred. Would such mechanisms work smoothly without central co-ordination? It was impossible to tell. However, evidence from Valley High would seem to suggest that without the proper co-ordination of all school activities, there would be problems in the total school environment beyond the classroom.

Somo often lamented the fact that there was no longer the desirable link between the education provided by schools, the home and other social institutions such as churches, threatre, and the community at large. The result was that some students had come to look upon their involvement in the activities of some of these institutions as either punishment or a waste of time. Somo had said,

> "Those students who come from well to do homes, tend to see school as a punishment, particularly those aspects of it that involve manual work. Those students who come from modest homes look to school to save them from the manual labour at home. So when they get here and discover some of the

> learning involves doing manual labour they get very upset".

What Somo was in fact, echoing is the growing concern among educators of how well national schools which educate the elite of the nation, succeed in developing men and women with an acceptable combination of intellectual, technical and social skills. An insight into student perceptions of what the goals and activities of a secondary school education ought to be, is the subject of the next chapter.

Chapter 5

STUDENT GOALS FOR EDUCATION

In the foregoing discussion, perceptions of school heads and teachers of the goals of a secondary school education in relationship to the quality of school management were presented. At Inland High, the goals defined by the school head fitted well into four main purposes of secondary school and adolescent development namely: developing thinking skills (Cole et al. 1975); teaching how to behave in formal organizations (Katz 1971); conveying society's mainstream culture (Bronfenbrenner 1979); and providing opportunity for peer interaction (Coleman 1961). It was evident that a great deal of school management structures and their co-ordination, had the objective of tracking students (and teachers) so that academic learning could take place in an optimal social environment. But in addition to the provision of an optimal social environment for academic learning, the comprehensive training of students and co-ordination of the management structures underscored the implicit belief that extra-class management units, settings, contexts and routines also provided useful social learning to students.

At Inland High, this belief was made explicit and was articulated in the traditional philosophy of work consisting of intellectual, physical and spiritual development. Comprehensive training was expected to accomplish such development, through student participation in farm work, house chores, games, clubs, chapel, societies and community work. The goal was to develop knowledge and skills that would enable students, " to fit into organized society where there are leaders and where some students may become leaders." The school head and teachers regarded the school routines, the signalling of time and activity by the bell, and the division of responsibilities for managing various school activities and services among staff, students and other school personnel as presenting opportunities for students to learn the skills leading to the achievement of that goal. In pursuit of this goal, the aim that "all talents and resources available among students be developed and be seen to have made a positive contribution to the existence of a harmonious school community", could also be put into practice.

There was no doubt that Inland High provided opportunities for students to learn skills to work towards these social goals. As Dreeben (1968) pointed out, schools are the first settings in which young people are taught these critical skills and understanding. Some of this teaching is explicitly a part of the disciplinary structure of a school and classroom (e.g. obedience to rules and respect for the authority of office). Some are tied up with the performance of academic work which involves the teacher's incentive structures. And other teachings are reflected in policies, such as class level grading of students, which, although justified on grounds of efficiency, nevertheless train young people to think of themselves as belonging to categories and to accept the imposition of limitations and the granting of privileges solely on the basis of their membership in those categories (Hamilton 1984).

But presenting opportunities for students to learn various forms of knowledge and skills is one thing, learning and internalizing them may be quite another. Assuming that Inland High's program consisted of all these components, how well did the school succeed in convincing students not only of the usefulness of such knowledge in their present lives but also of its importance to their future? To what extent did the school program of comprehensive training succeed in imparting to students a balanced perception of the goals of learning both intellectual and social skills within a broader society where academic performance seems to be the major recognized achievement of schooling? This chapter presents data on the perceptions of students at Inland High of the usefulness of various management structures in the curriculum for the developement of social skills and attitudes.

Data Collection and Analysis

Initially, 35 students representing a cross section of all levels of classes and various subject subsets were interviewed. The selected students were asked the following types of questions: How would you describe the kind of administration in this school? Why do you think the administration is the way you have described it? What kind of things do you learn in this school besides subjects like mathematics? What is the use of these other things you said you learn? Why should you learn these things here since they are not examined? Are there things you would like to learn here that are not taught here? Why do you want to learn them?

The interviews produced more or less unanimous agreement among all 35 students on the goodness of all aspects of the school's administration. The following quotes were typical of some of the answers.

Asked, "you have said the administration is very good and that they treat you equally; what is the importance of this to you?" John, a first former replied:

> "Well before I came here I associated Inland High School with success as one of the best schools in the country due to academics. I expected that everyone here was more intelligent. I came expecting a special place. The very intelligent would be treated special. But when I came here, I realized things were just normal for everyone except for some things - the effort of the students, there is no loitering around for everyone."

When asked, "what kinds of things do you learn here besides subjects like chemistry, biology and all the other subjects on the timetable," Luke a second former stated:

> "Well definitely you learn here discipline and reading on your own....Your whole day is conditioned in such a way that whether you like it or not, you will - you will have time to read, and as time goes by, you yourself you come to realize the need to read and study."

In answer to the question "what do you mean when you say the administration is very strict," Hussein, a third former, explained:

> "The discipline here is such that you realize time means what you are supposed to do. And now since you know you have only that time to do that thing, you do it with all your ability - your best in everything. Competition.....the teachers here make you want to

> compete. There is competition. Everyone wants to do his best. Here the teachers tell you a good student is one who participates in class; he takes his work seriously. You have to perform well in class - every day, every lesson. Then they will say you are a good student, and then every year you see those they said were good get 6s or 7s."

John, a fifth former, when asked, "I am not clear about what you have called learning the real life; what is it," replied:

> "Uh, here it is very real. It is what you do every day. They teach you real life. For yes, when you come to this school first, you learn how to meet other people so you learn how to live with other people. Second, you learn activities like games. Third, you learn to value body exercises for your brain. In the clubs and societies you learn how to associate with others; in debates, you learn how to communicate with others. In chapel, you have an idea - that sense of religious direction - sort of actually on a daily basis. You have to work hard to learn all these things in the short time you have."

And finally Stephen, a first former, when asked: "what is the most important message you would send to a student who wants to come to this school next year", said:

> "This is the best school. Here you learn so many many things. All these will help you in your life in the future. I like all the subjects, all the societies I am in. I don't mind doing all those things like cleaning, chapel and the games. They are good for you. There is nowhere you will be without some work. I think by the time I am in fourth form, I will be a better boy."

Consistently, each student's response made definite and clear reference to the points frequently stressed by the school head in speeches during parade and chapel and in the various documents written for student notices. This consistency of opinion at all levels of schooling was hardly surprising considering that students had been reminded before the interviews to be "nice but formal" by the academic master. But while student responses did not perhaps, reflect 'frank individual opinion', they clearly identified the main points of emphasis stressed explicitly and implicitly by the school and which students had learned not only to verbalize but also to act upon.

These points concerned the following salient elements of school organization:

1. Equality among students;
2. Discipline as a prerequisite to learning and high achievement;
3. Learning independently;
4. Time as a precious commodity;
5. Competition as a healthy attitude;
6. Participation in class as a main attribute of good studentship;
7. Integrating activities for the brain, body and soul;
8. Living together with others in a selfless community; and
9. Manual work as part of school and life in general.

At Inland High, there were very few student punishments. Students did not speak rudely to teachers. Students always knocked on the staffroom door and patiently waited for a teacher to come out to solve their problem. Total silence reigned during prep time and library, and no student missed games without permission. Was it possible that in a school with 650 adolescents, everyone had internalized the school's dictates as fully as the 35 students interviewed and as generally observed on a daily basis?

To find out how unanimous the expressed perceptions and opinions were, 360 students were asked to complete, anonymously, *School Organization*, an 11 item open-ended questionnaire, designed by the researcher and the school's academic master. Three items (1,6,8), asked students to describe school routines and typical daily activities. The purpose was to discover how individual students characterized routines and possibly judged about their significance as content for learning. Four items (2,7,3,11) asked students to judge the roles of school personnel in school organization, in particular, the school head, teachers and school prefects. Items 4,5,6,9 and 10 asked students to assess the total school's organized environment and identify which of its components, given the choice, they would like to keep or discard and to describe the similarities and differences of the school's organized environment to that found in other schools. Table 3 shows characteristics of the respondents.

Table 3: Characteristics of Respondents

Class Level	Age Range	Frequency (%)
1	12 - 16	106(29.4)
2	13 - 18	105(29.2)
3	14 - 19	93(25.8)
5 & 6	17 - 23	56(15.6)
TOTAL		360(100)

Perception of the Functions of Routines

Students were unanimous in their naming of key routines and their functions thus supporting the school's stated goal that routines "were necessary to get everybody organized for learning and teaching". Divergence of opinion, however, was evident in student descriptions of the characteristics and behaviour of personnel entrusted with exercizing the powers governing various routines; and in student interpretations of the "real" purposes for which the rules governing the routines should exist. There was still a solid 38.9% of total respondents who, like the previously interviewed 35 students, agreed with the school's description of the purpose of routines. This group was made up of mostly first formers, the youngest and newest group in the school; and fifth and sixth formers, the longest staying and oldest group in the school. The reason for this developmentally biased response might have been due to two factors: first, the newest members of the school still had the euphoria and pride "to be here", and probably felt that they had to report all the "goodness" of this new place. In addition, first formers were still young and "obedient" primary school graduates, who probably had not yet attempted to extend the routines and rules governing them beyond the permitted boundaries. The same conditions would apply to the new fifth formers who had not been in the school for the first 4 years of secondary school. Second, for some seniors, fifth and sixth formers, protection of the schools' good name and image might have been important. After all, these students had been very successful in the school and probably appreciated the official functions of the routines for this reason.

The 'dissenting opinion' of about 50.1% of the students, was voiced mainly by third, second and a few fifth formers. The gist of opinion was that routines should consist not of a balanced set of activities, as stressed by the school, but only of academic activities - examinable subjects and of "essential non-academic activities". These one student described as games, sports, clubs, socities and free time. Question 3 on the questionnaire asked students. "suppose you were given a chance to re-organize the school day, what new activities which are not there now, would you put in; and which activities in the present daily schedule, would you leave out, and why? Chart 9 shows the activities students wanted to abolish and the reasons for their abolishment.

Chart 9: Activities Students Wished to Abolish

Activity		Number and (%) of Students	Reason
1.	Farmwork and Housework	256(71.1)	-Wastes learning time -Best done by hired workmen
2.	Parade/Assembly	220(61.0)	-There in nothing to learn
3.	Chapel	187(52.0)	-There is no content to learn -Not all students will become churchmen
4.	Speeches by school head	122(34.0)	-All students can read (instead, write and put points on noticeboard)

A major reason why students wanted various activities abolished was to save time. A student had rhetorically asked, "why waste learning time on assemblies, talking about simple and useless things which everybody already knows ... or telling the whole school something which concerns only one or two boys?" The time saved, it was stated, was to be scheduled for more academic learning, reading and school outings. Time saving for learning was the most crucial element increasingly felt as students moved from Form 1 to Form 6. But significantly, no student had suggested saving time by abolishing clubs, societies, games and sports, even though these activities took up three times as much time as that taken up by chapel, housework, farmwork and parade together. As for sports and games, at Inland High, just as in the rest of the educational system, the folklore identifying body exercise as a stimulant to intellectual functioning was strong and permanent. One student had observed that games and sports were necessary in order, "to break from academic learning and to increase the brain's capacity to absorb more, afterwards." Regarding clubs and societies, students recognized that the content of many clubs and societies, was subtly academic and that the mechanisms of practice and expected excellence not only facilitated proficiency in cognitive functioning and mastery of communication skills, but also ensured the competitive spirit considered essential to intellectual pursuits.

During parade, the head of school often stressed that, "each student must show that he exists in this school - inside and outside the classroom". But students differentiated between engaging in sport as a stimulating body excercise and devotion to sports as a means of showing that a student existed in the school. Luke, a fifth former, stated, "a student is not remembered for his serious housework or silence during chapel or winning a few trophies. He is remembered for being in the top ten". Therefore, students had understood and learned the value of time, just as the school often stressed. But students had also understood its use in relationship to only serious academic work. What students had failed to learn or refused to understand and accept or both, was the school head's frequent prescription, namely that, "successful living depends on an individual striking a proper balance between pursuit of knowledge of God and self, academic work, physical exercise, proper use of leisure time and contributing to community service."

Nature of Curriculum for Learning

It was unlikely that more than 50% of all students did not see the ameliorative aspects of housework or farmwork. The point of discrepancy, however, lay in the school's and students' perspectives of the purposes and achievement of the goals accruing to these and similar activities. The school predicated housework, farmwork, chapel and other out-of-class activities, not only because of their enviromental improvement aspects or as a "break" from academic work or as "a stimulant" for cognitive functioning, but most vocally, as a channel through which students would learn social attitudes and skills relevant to the present and future. Students were exhorted that through these activities, they would become self-reliant and self-disciplined citizens. Through the consistent routine and through various activities the school sought to show students how to secure permanent commitment to three vital goals, namely; moral discipline, academic excellence and proper use of time. However, students saw as crucially significant only the use of time for attaining academic excellence,which would in turn determine "what one became in the future".

To students, non-academic content and activities was not important for learning. One did not learn by doing housework, farmwork, or by attending chapel. Learning of academic content supported by the school's previous visible and excellent academic record was the major organizing concept for student perception of what was important for learning, each deriving credibility from the other.

There are two issues here for those who wish to encourange more vocationalization of secondary school curriculums within the present organizational structures. Is it possible to convince students that what they do as school chores contributes to their future? Can it be assumed that schools impart to students morals such as responsibility, democracy and tolerance? Or does putting premium on academic achievement in educating the elite, mask from both the schools themselves and the public in general, the possibility that graduates from such schools are not as fully educated as expected?

Important insights into possible answers to these questions were provided by student responses to the following four questions. Why is there a headmaster in school? For what reasons would you go to see a headmaster? What are the problems you face outside of class? If you were headmaster of this school for one day what would you do and why?

Responsibility, Democracy and Tolerance

First, student perceptions of the role of the head generally mirrored those stated by the head himself and teachers, namely; as manager, organiszr and planner. But students also described the school head as leader, father, boss, central man, headman, chief, symbol, figure head and final authority. Thirteen categories defining the functions of the school head were stated as shown in Table 4.

Table 4: Functions of Head as Perceived by Students

Function	Number of Students and (%) of Totat Response
01. To run the school	223(62.0)
02. To lead	205(57.0)
03. To be accountable to higher authority	205(57.0)
04. To control people	201(56.0)
05. To rule over students	201(56.0)
06. To organize	198(55.0)
07. To collaborate with students	180(50.0)
08. To protect students	180(50.0)
09. To arbitrate among students	166(46.1)
10. To co-ordinate school work	148(41.1)
11. To develop school facilities	148(41.1)
12. To maintain facilities	148(41.1)
13. To repair old buildings	122(34.0)

Only one student, a third former stated that, "there is no need for a headmaster here, since things run well when he is not around".

A typical description of a school by students was, "an institution with a headmaster as leader who is appointed by the Ministry to run the school. The school belongs to students but there are some good and bad teachers and students who must be punished so that the students can do well in national examinations." Students defined school as a "large place" which they compared to nine other large places where, in each case, six attributes could be identified as shown in the Chart 10.

Chart 10: Student Descriptions of a School

Description

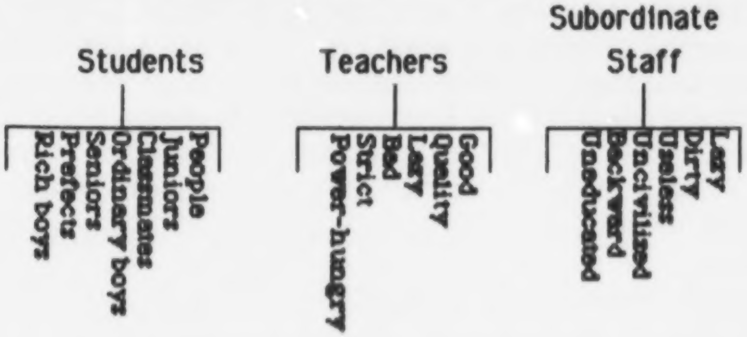
1. An institution
2. An organisation
3. A community
4. A society
5. A small government
6. A family
7. A household
8. A clan
9. A factory

Characteristics of Large Places

1. There is always a leader
2. It belongs to groups of people
3. Owners have different interests
4. Answers to higher authority
5. Has expectations
6. Welfare of owners paramount

These categories and characterizations were used by students to describe the head's social relationships with other school personnel. School personnel were placed into three main categories and their behaviours characterized as shown in Chart 11.

Chart 11: Student Categorizations of School Personnel


Students
People
Juniors
Classmates
Ordinary boys
Seniors
Prefects
Rich boys
Teachers
Good
Quality
Lazy
Bad
Strict
Power-hungry
Subordinate Staff
Lazy
Dirty
Useless
Uncivilized
Backward
Uneducated

The point to note about the *Students* category is that the description of students as people or juniors for instance, was perceived as referring to the quality and specific characteristics of the groups concerned. The stable and changing roles and functions of the school head were stated to depend on the presence of personnel who exhibited the behaviours described in Chart 11. By matching the categories of school personnel as identified by students to the perceived roles and functions of the school head, it became evident that the head was expected by students, to apply only certain of his functions to only certain categories of school personnel. Chart 12 shows students' expected allocation of head's functions to various personnel.

Chart 12: Allocation of Head's Functions to Personnel

Head's Function	Eligible Personnel	Reasons for Eligibility
1. Lead, manage, organize, co-ordinate, run school	-All students -All teachers	-These persennelmake up a school without them, there is no school
2. Collaborate	-All students	-Students own the school
3. Control	-Bad teachers -Rich boys -Seniors -Prefects -Subordinate staff	-Persons with behaviours and interests unacceptable to "people"
4. Protect	-"People" -Classmates -Juniours -Ordinary boys	-Persons with behaviours and interests acceptable to "people"
5. To be accountable	-All students -Higher authority	-Students own school -Can control school head

Only functions of leading, running the school, and collaborating with students were perceived by students as requiring the head to be a "wise man and a source of inspiraton". Students perceived the head's other roles and functions as contingent upon behaviours by a small number of different personnel as shown in Chart 12. In other words, not all teachers and students were eligible for the head's functions of control, protect, and rule. For instance, the head's control function, which generally received student approval, was expected to be reserved for persons such as rich boys, prefects, seniors and subordinate staff, all of whom were perceived to have unacceptable behaviours and interests. However, the head's protection function was expected to be reserved for persons described as "people" who were described by a third former as, "boys demoralized by over-vigilant prefects and teachers; ... those whose innovative gestures are supressed; ... whose good opinions are not listened to; ... from whom the headmaster hides the truth and what is really going on; ...those who are dictated to; ... those who are punished for nothing or for the sake of it; ... those who are hustled; ...those who are constantly reminded of what they already know". It was in the protection of "people" that the head was said to be severely incompetent. The most frequently stated reasons why the head had failed to deal properly with "people" were that: "he did not understand 'people's' feelings; he did not have proper control over bad boys and teachers; he did not know what his prefects were really like; and, he ruled over 'people' without the necessary intellectual resources". Students were extremely eloquent in describing the unacceptable characteristics of personnel eligible for control. Chart 13 which presents student descriptions of the behaviours of personnel who needed the school head's control, also conveys the intense passion with which students perceived such unacceptable behaviours.

Chart 13: Behaviours Eligible for Head' s Control

Eligible Personnel	Unaccetable Behaviours, Attitudes and Actions
1. Bad teachers	-Hard, harsh, spiteful, power hungry, lazy, boring. unsatisfactory, unqualified -Display shallow reasoning; give students a rough time; mistreat, man-handle; bask in class (waste time); do not know what they are doing in class
2. Prefects	-Expect others to do what they, themselves, do not do; give unfair punishments; behave in manner likely to cause chaos; are boring; harass "people"; hate; show favouritism; are over-vigilant, spiteful; sit on "people"; lack reasoning; deny "people" their rights to defend themselves; are untrustworthy; are always against "people"
3. Seniors	-Perpetual law breakers; chronic misbehaviours; notorious criminals; unrullies; harassers; bullies; blackmailers; oppressors
4. Rich boys	-Show off; reject school food and wait for their fat mothers to bring them food, cakes and money; have many outings; drink and smoke
5. Subordinate staff	-Lazy, dirty,uncivilized, backward, uneducated; do not clean properly; shout; speak in their mother tongue

Anindication of the kinds of motives that students read into the behaviours of school personnel particularly, prefects, seniors and teachers is also evident in Chart 13. In describing reasons why they would go to see the school head, students fell into four surprisingly neat categories, described by the researcher as requesters, advisers, complainers and blasters. Students who had stated that the function of the head was primarily to lead, to run the school, organize and co-ordinate activity, rarely referred to themselves as "people"; and they stated quite frequently that they would go to see the head "to ask or request" for information, permission or some resource. Students who had stated that the function of the head was to collaborate with students, and who had often described their colleagues as classmates stated frequently that they would go to see the head in order to advise him. Students who saw the head's function as that of control consisted of two groups; complainers and blasters. Complainers were mostly students who described themselves as "people" but referred to others as "other boys" or classmates. They said that they would go to see the head to complain about maltreatment by bad teachers, rich boys and school prefects. Blasters were students who described others but rarely themselves, as "people" and who said that they would go to see the head "to blast him". With the exception of requesters, all other students said they would go to see the head in order to complain, advise and blast him regarding issues of unacceptable behaviour, attitude and action perpetrated by bad personnel as shown in Chart 13. It is evident therefore, that there was a wide range of possible sources of dissatisfaction among students regarding 'bad personnel'.

And finally, descriptions of what students would do if they became head of the school for a single day, showed clearly the dichotomy between those who did and those who did not feel themselves and others as underprivileged within the the school. Students who did not regard themselves and others as underprivileged, in other words, the requesters and advisers, gave general suggestions in order to improve the welfare of students, namely; diet, uniforms, school facilities and buildings, and they wanted to increase the number of outings from school. Students who perceived themselves and others as underprivileged, the complainers and blasters, were quite specific in their "demands". They would: reinstate the Authors Club newsletter which the head had banned; dismiss the lazy teachers especially those teaching French and mathematics; transfer power-hungry teachers; demote all prefects and elect new ones; and hold their own assemblies.

The call for the revival of the student newsletter was an interesting demand showing how well the "people" understood the power of information and dramatizing once again, the fact that by banning the publication, the head had generated tension between himself and students similar to the tension that often surrounds access to and censor of media by political personalities in Kenya. Students had stated that before the publication was banned, they had used it to "blast the headmaster, the prefects, bad teachers and anybody else who gets in our way". Actually, all the publication did was to use cartoons and questioning innocence, to print an occasional rebuke or indirect insult. But this kind of portrayal of school personnel had apparently given students a certain measure of power in "hitting back at the system". The consequence of banning the newsletter was that more than ever before, students created a substantially exaggerated view of the power of the club's newsletter as "a weapon".

The "people" who generally disagreed with the present status of school management only wanted to counteract the head's authority by confrontation. While they only hinted at organizing themselves into an open resistance group, choosing their own prefects and holding and addressing their own parades, they most definitely wanted to deny respect for authority and deprive authority of access to visible practices attesting to and enforcing control. This was quite evident in the kinds of limitations that students sought to put to the head's accessibility within the school and to various types of students. For example, students pointed out that a head should never involve himself in "small, petty and unimportant matters". His concern should be with "very official, high, sensitive and secretive matters that nobody else can handle". Students believed that secretive authorities had some type of mystical powers enabling them to come up with "the right solution" when and as the situation demanded. The head was expected to be "aloof and not abundant"; this would ensure a rare personality with deep mental resources, seemingly honest and solemn. Students said that they in fact, abhorred the head's attempts to get close to students and to talk about obvious things and gossip. They considered such actions as below his dignity and instead, preferred him to cultivate an aura of inaccessibility.

Three reasons were given for these boundaries to the head's interaction with school personnel. First, students said that it was most important that the head gain popularity among students just as any leader should be popular among his subjects. But students were ambivalent with regard to the mechanisms through which students would reaffirm the head's popularity. This ambivalence led to the awkward suggestion that the head should speak only on those occasions sanctioned by students and that if students wished, they would applaud the good work of the head. Second, it was pointed out that the closer the head became to individual students, the more he was likely to be influenced by the opinions of those close to him especially, the rich boys. Students recognized money as an important form of power which attracts those who wish to share in influencing others and they considered material sanctions as an instrument of great effect to curb the influence of the rich boys. It was interesting that sanctions against showing off wealth by rich boys, were suggested not as detrimental to poor students, but in the name and image of the school. Third, students argued that "people relate better to other people when they, don't know them well." Familiarity breeds contempt. The mystique of a personality not totally revealed and understood was perceived to automatically bend people's wills so that the leader would maintain respect and popularity. Consequently, in acquiring popularity, the head was advised to ensure that students "do not discover that he is just a figurehead and not as bright as he should be". A good head, students had recommended, "just like a traditional father, is good to his children. But the children never know his secrets. Therefore, they continue to love and respect him for ever".

But these very prescriptions were contradictory to those that the same students had outlined in order for the head not to "rule over people" and in order to "protect people". It had been suggested that for the head to understand the feelings of "people", the head should "study" individual students in order to discover who was good and who was bad so as not to punish innocent students. Students had suggested that the head should participate more in school sports and games, be chairman of a school club, teach in all classes at all levels of the school, and hold frequent discussions with individual students on various issues so as to appreciate the diverse capabilitites of students. What was the explanation for these apparently contradictory prescriptions?

A possible explanation was evident in the data. First, students perceived the school as belonging to them and regarded all other personnel as being there for the sake of students. Believing that others, including the head, should act upon student's options, decisions, needs, and interests, gave rise to a feeling of importance and status epitomized in the frequent expression, "without us, there is no school". But students also recognized the school as just another "large place", where owners were not necessarily the leaders with power and authority to make things happen. In attempting to resolve the ensuing conflict, students had constructed both a liberal and radical ideology which they perceived as more relevant to their situation. Examples of students' liberal ideologies concerned matters such as student decisions about the uniform, food, school outings and free expression for all. Student radical ideologies concerned issues such as non-payment of fees; summary dismissal of bad staff and students without appeal; restricting admission to the school to "people" only; doing away with all kinds of group meetings addressed by the head and prefects; controlling strictly how much personal property students brought to school; and preventing rich parents from visiting their children.

Students, on one hand, wanted openess, discussion, collaboration and improvements that could benefit all. On the other hand, they demanded secretiveness, social distance between various statuses of personnel in the school, and drastic and ultimate mechanisms to effect control. These expressions of opposing ideologies were the basis of latent conflict within various groups of students. For example, while one group of students pointed to inadequacies in the way the head handled student problems, other groups stated that these accusations of inadequacy were in fact, unfounded and were the brainchild of spoiled and rich boys. While one group claimed that the head frequently created problems for students, another group stated that the problems experienced by "bad boys" and "rich boys" were "created" by students. One group of students saw the strict rules and routines guiding every day student actions as necessary to the social growth of students and their high academic achievement. Another group saw these same rules and routines as "turning students into moment to moment survivalists instead of the responsible men intended".

Students had suggested that the main factor that prevented the head from providing "goodness to all students" was his failure to understand "people's" feelings. Yet it was also evident that students wanted interactions that increased personal distance between them and the head. Students were particularly critical of actions in which the head seemed to discard this expected distance, authority and power and put on a facade of "equality to everybody". For example, students regarded the head's action of running across the compound so as not to be late for class, not as a believable example to them and other teachers, but as mockery and ridicule of student predicaments whenever they were caught late by the bell and were liable for punishment. Students expected the head to develop the skills of identifying himself with the common beliefs of students by persuasion and command and not by ostentious acts. Underlying student dislike of the head's attempts to be "one of the guys" was fear that this would soon result in different treatment of various groups of students, particularly, the Senior and rich boys. Students knew from their experience within the broader society, that these various "rich groups" had great influence on important decisions often to the detriment of the general public. Although students were dissatisfied with the execution of the perceived roles and functions by the head and prefects, they realized the value of and the relative legitimacy and respectability associated with these various statuses, roles and functions. Students, therefore did not advocate total abandonment of the two positions but recommended improvements.

Students who generally agreed with the goals and actions of school management, were unlikely to think of resisting the head's authority and in fact, wanted to help with advice, in order to increase the effectiveness of his authority. But even this group did not necessarily want a head with true power, a head who was able to win acceptance for substantial views of his own. Rather, students wanted a head who could conform to their opinions.

Emerging Issues

This chapter started out by asserting that presenting opportunities for students to learn various forms of social knowledge and skills was not a probable guarrantee that students would actually take the opportunity to learn the prescribed knowledge and skills. Data have been presented in an attempt to delineate what students seem to have learned from the school's comprehensive training curriculum. Several points have emerged. First, it was evident that students had been able to differentiate between the purposes of various activities of the comprehensive curriculum and fit them into three categories, namely: activities that were academic and therefore, worth learning; activities that were supportive of academic learning, and therefore, worth participating in; and activities that neither contained academic content nor supported academic learning and therefore, not worth learning. Therefore, it would seem that school management had not succeeded in convincing the majority of students not only of the utility of this third category of knowledge in the present lives of students but also of its importance to students' future and in the broader society.

Second, with regard to student developement of social skills and attitudes, two points stood out in all student descriptions of school personnel, namely, the severity of language, and the immense disparity between what students said they would do and what they were actualy observed to do, both of which present serious problems in attaching "seriousness" to the data that have been presented. The two factors are related and examining the existing conditions in the school seems to suggest that the descriptions should be taken with a measure of seriousness.

First, the unflattering terms in which recalcitrants were described only underscored the seriousness of internal discipline in the school as well as the intellectual abilitiesof students. The student descriptions revealed the magnitude of the gap between what they believed they were being told happens and what they thought should happen. In other words, in an environment of very strict internal discipline and co-ordinated functions, even minor abberations from the expected, have the appearance of gross violations. This is not to suggest that students exaggerated their perceptions of problems that they faced in negotiating the routines and rules of internal discipline at Inland High. In the final analysis, the matter is not whether or not prefects were that bad, teachers that lazy, "people" that underprivileged and seniors that privileged. The final matter, and one which students described superlatively, was that neither the school head nor teachers, not only at Inland High, but in the entire educational system, was prepared to look at an issue such as school management with the breadth and multiplicity of perspectives which alone can result in a balanced view by both students and teachers. Throughout their descriptions students were not prepared to judge the leaders, i.e., the head, teachers and prefects, as persons with strengths and weaknesses. Students demanded only strength from leaders, precisely because that is what school management demanded from the students on a daily basis. Whatever weaknesses students may have shown as individuals and as a group, were taken care of somewhat ruthlessly by the strict internal discipline. This assiduous cultivation of an image of only towering strength by school management, resulted not only in equally one-sided perspectives and unreasonable expectations from students but perhaps, more poignantly, prevented students from genuinely utiliszng the provided opportunities to acquire useful social skills and positive attitudes, perceptions and beliefs about school personnel and the broader society.

Second, the harshness of the descriptive language used by students said something not just about the head, teachers and students at Inland High, but also about conditions existing in society. Inland had bright students and many read daily newspapers. The descriptive words used were often similar to those used in public media in describing unacceptable behaviours by leaders and "bad elements" in society. With their good mastery of communication skills that gave them the power of self-expression, students were able to 'reproduce' the strongest imagery to characterize their descriptions, beyond the general fact that as teenagers, they always prefer to express themselves strongly. Consequently, what they presented was not mere description. Despite the limitation of time that constrained students in completing the questionnaire, many used anaphora, metaphors, repetition and other rhetorical devices to achieve the effect of piling up evidence to convey the passion of disapproval which they felt.

It was not suprising that in a school with a strong science bias, students should select scientific imagery to lend drama to descriptions of interactions between themselves and those in authority. For instance, relations were said to have disintegrated, crises were precipitated, friendships between boys and girls were dissolved, discipline was impermeable, students collided with prefects, students had to rocket (revise furiously), bad teachers gyrated in the classroom (like hydra) and when students were caught gadgeting (reading after bed time) they were demolished by the system. The themes of emphasis were not just the harshness of the system but the immorality and indiscipline of those who made it run. This dramatization to particular situations and people pointed clearly to where the fault lay - with the leaders.

With regard to the problem of the immense disparity between what students said they would do and their actual observed behaviour, it must be emphasized that at Inland High, the threat and actuality of punishment in cases of all disobedience, rudeness and any other breaches to internal discipline were real. During the research period, not a single incidence of student rudeness to a teacher was observed even though occasionally one heard a teacher complaining vaguely of "some of these fellows who are becoming rude". However, the wide gap of disparity between actions and intentions may once again, be explained by how hard all students strove to maintain the good image of the school to outsiders. This condition did not exist for the written self-reports. In the first place, the *School Organization Form* was designed with the school's letterhead; and was distributed and completed anonymously during prep time at night. As a result, students probably regarded the form as a purely internal document. Here was a rare opportunity for students in this school to do "anonymous work" in an enviroment which always stressed that each student should show personally, that he exists. There was the real temptation to write what one does not normally dare. This is what gives credence to student descriptions and to the possible existence of the conditions described.

Another example of the same kind of "anonymous work" was experienced in the school twice in1983. During drama week, girls from another school had come to Inland High to see the school's play which was staged from 7.30 p.m. to 9.30 p.m. As girls left the hall, boys in forms 1 and 2 who had also watched the play, tried to tease and follow the girls to the bus. Teachers believed that the boys had grossly misbehaved, "that sort of thing is not expected to happen here". All five Senior boys who were interviewed after the event agreed that, " the Juniors had gone all jelly which is bad for the name of the school". But not all boys in forms 1 and 2 had misbehaved. The group was warned that unless the culprits admitted to their misdemeanor, everyone in the two classes would be punished. No one owned up. For half of a school day, every first and second former slashed grass as punishement under the direction of groundsmen.

The immense disparity existing between the spoken and written perceptions of students and their daily behaviour, although a general issue in all populations, should be of interest to school management, in considering the achievement of social goals in education. A question which cannot be answered here relates to whether or not the reported emphasis at Inland High on learning social skills was real or imaginery. Expressed in a different way, it might be argued that none of the 360 students who wrote self-reports were telling the truth. If that were the case, then there would be a more serious issue. If by reference to student perceptions at Inland High, where there was a clear emphasis on and practice of teaching social skills, it was difficult to judge exactly how successful the school had been in this aspect of education, what could be predicted for students from schools which have even less reported emphasis on teaching social skills?

Second, it would appear that in actual fact, there was no explicit teaching of social skills at Inland High. What existed was a clear system for doing things at particular times for the focal reason of controlling both teachers and students, in order to do academic work efficiently. This view would be supported by the opinions of 39% of the respondents who repeated the school's version of the benefits of the management system and comprehensive training. It could be assumed that by participating in these structured activities, some students came to learn and internalize the implicit social objectives and skills accruing to such activities, while the remaining students simply learned only what these activities were explicitly there for, namely, controlling them. In both cases there appears to be a problem since it does not seem likely that very strict routines will nurture social responsiblity even though adherence to such routine may appear to support academic learning. Third, it would appear that the futurist notions upon which students are frequently exhorted to learn social skills actually serve little purpose, since they make very little sense to students in their present state. Students would probably be much more amenable to following routines if the practical everyday school expectations that necessitate such routines were to become self-evident to students rather than be dependent only on their utility in the future. This would of course, dictate fundamental reorganization of present conceptions of authority, the nature of students, the processes of teaching and learning and the application of learned concepts, be they academic or social, to real life situations.

No one would doubt that students need to learn how to live in an organized society and that they need to understand the consequences of their behaviour, to learn to differentiate between persons and positions, and to live in a community where resources are scarce and must therefore, be shared and conserved. Observations of school processes however, reveal that little effort is made to use the school environment in which students spend a large part of their lives, to develop their practical ability to diagnose the structures, purposes and workings of the school's formal and informal management framework. If a student lives in a school for six years, without an understanding of the school structures, purposes and workings so as to act appropriately, how reasonable is it of educators to expect that students will understand the larger environment out there and act upon it appropriately? Similarly, if a student finishes secondary education with no clear notion of why and how he should change himself for his own betterment, how can he be expected to change himself and others for the betterment of the nation?

Chapter 6

CONCLUSIONS

The research study, **Educating the Elite: Harmony and Conflict,** has presented data on the nature of broad educational processes in two national schools the students of which achieved very high performance on public examinations. The high academic achievement of the two schools was known and therefore, assumed, so that the study concentrated on tracing the nature of the social teaching-learning curriculum. It was assumed that the emphasis which the school head, as the key administrative and management authority in the school, placed on the articulation of the goals of a secondary education, would be reflected in the nature of prevalent beliefs, perceptions and practices. The personnel's articulated goals, perceptions, actual behaviour, actions and interpretations were documented. Similarly, what personnel said they did, taught and learned through their interactions with various aspects of school management was examined. The existence of various mechanisms to co-ordinate the various activities was regarded as an attempt by the school to provide a shared language through which to assess the school's goals, activities, present strengths and weaknesses and to implement corrective action.

It was observed that Inland High appeared to have been very successful in evolving and using a co-ordination mechanism that encompassed all school activity alongside the comprehensive training program which operationalized the school's four main goals for a secondary education. The most important achievement of the co-ordination system was that it enabled personnel to gather, evaluate, disseminate and use information about the functioning of various school units, routines and activities so that ultimately, academic teaching would be undertaken within a convivial social environment. The school's goals explicitly stated that the comprehensive training program, consisting of academic work, routines, community participation in manual work, chapel and extra-curricular activities, taught students particular social skills and attitudes. These included responsibility, tolerance, value of time, co-operation, leadership, ability to fit in organized social situations, and the development of a view of the balanced contribution of intellectual, physical and spiritual activities to student overall social growth.

However, there was no explicit teaching of these social skills. Instead, school management had assumed that by participation in activities of the comprehensive training program, supported by speeches and writing by the school head, students would be able to learn the intended social skills, and develop the coresponding positive attitudes useful during school life as well as in the future. It was observed however, that a large proportion of students did not seem to have recognized the importance of the overall goals of the comprehensive training program. Instead, students appeared to regard as important only goals and activities that explicitly supported academic achievement, and considered activities supportive of social goals as not only a waste of learning time, but also as basically oppressive of student freedom. It was also observed that teachers at Inland High regarded the comprehensive training program as too demanding of teacher time and expertise in areas of school life that had little to do with academic work. Consequently, teachers felt controlled by the school requirement that they should participate in all aspects of the comprehensive training program and in the pervasive co-ordination mechanism, the activities of which they considered as unnecessarily complex and repetitive.

At Valley High, it was observed, that the school had been very successful in constructing and implementing a co-ordination mechanism for the academic aspects of the curriculum and in the food department. All other school activities appeared to be poorly or not at all co-ordinated. There appeared to be a pervasive disorderly appearance to all social activities, and the school's physical facilities were mostly delapidated, inadequate and their condition continued to deteriorate during the life of the research project. Yet high academic performance thrived in this environment, and there were no major breaches in student discipline. Most teachers were happy with the disproportionate concentration on academic work and felt free to plan their teaching without encrouchment on their time by what they considered as unnecessary management duties and extra-curricular activities.

The data from these two schools were generally supportive of findings by Stallings et al.(1981), who examined the effects of school policies on pupil outcomes in eight secondary schools that operated on a wide variety of policies and organizing plans. Since the present study was based in very different administrative structures from those in the Stallings et al. study, the similarities in findings appear somewhat obscure. First, it was clear that teacher morale was high in each of the two school with regard to those policies and rules which were clearer and more consistently enforced. At both Inland and Valley High, the goals for academic work were clear and consistently enforced and no teacher had qualms about his role in this aspect of school work. However, morale was generally low with regard to other school goals basically because such goals seemed ambiguous in the wider context of society, since teachers realized that students would be better rewarded if they performed better in academic tasks than if they spent a lot of time pursuing non-academic goals. Even though teachers at Inland High appreciated the value of the comprehensive training program and aspects of the co-ordination system, this appreciation was due more to the fact that the two sets of activities undergirded a convivial environment for academic work, than to teacher belief in the long term social goals of such activities.

Second, absence and presence of an overall co-ordination mechanism for all school activities at Valley High and Inland High respectively, can be seen as providing administrative support services and fewer burdensome duties for teachers and thus probably supporting higher teacher morale and less classroom misbehaviour by students. At Valley High, absence of co-ordination of activities other than those in the academic curriculum and the food department, and indeed, disregard of participation in many extra-curricular activities and duties by teachers and students, all increased opportunity for the pursuit of the academic goal for which both teacher and student morales were high. At Inland High, the presence of a co-ordination system provided administrative services by: procuring all needed resources and of course, caring for all resources intently; keeping alive a classroom tradition demanding that teachers be challenging, work hard and push their students to their uppermost academic limit, and cater as much as possible, to individual student needs; ensuring that student performance on school-wide designed tests were debated by the whole staff and that if remedial work was needed, there was a system to implement and assess such action; and making sure that the social aspects of the environment were very clearly defined and demarcated so that none of the behaviour demanded of students in academic learning settings would be unwittingly, transferred to social contexts where different levels of interaction occurred.

Third, even though the levels of support given by the two school heads to the work of teachers, was very different, overall both heads were very supportive of staff. The head of school at Inland High was regarded by staff as an able administrator, a model teacher and an inspiration. His constant presence and participation in all school activities, although perceived as coercive by some teachers, was nevertheless, regarded as supportive of teacher work and morale. At Valley High, the head attempted to support teachers by extolling their good and hard work publicly. Indeed, the head's indiciveness and inability to censor teachers could be regarded as an attempt to maintain a genial atmosphere among all teachers.

Policy Implications

At Inland High, there were many useful combinations of policy and structure, for instance, the creation and sustainance of a good social environment for the working of all school personnel, which were observed to be supportive of academic work. However, as discussed earlier, many aspects within these structures were viewed by various sections of the school community, as comprising both good and bad elements. It would seem that the search for a formula of school management that would satisfy equally the public, policymakers, schools, and various special interest groups is futile. What the data from the two schools underscored was the fact that as long as the education system still places premium on academic achievement, management effort in school will be directed toward the achievement of academic excellence at the expense of any other goals. It was evident that schools already know, that without a modicum of social discipline among teachers and students, academic excellence cannot be achieved; and that without a reasonable level of academic performance, social discipline would not be easy to maintain. Perhaps, then policymakers should assist low achieving schools to implement pragmatic decisions and actions that will enable students to work on academic tasks as a first priority.

It seems that [illegible] teachers and students feel controlled by school management. At Inland High, feelings of control were due to the fact that all aspects of school life were centrally planned, implemented and evaluated, so that both teachers and students felt that there was no room left for personal initiative, creativity, freedom and error. Moreover, teachers felt that as a result of the comprehensive mechanism of co-ordination, efficiency, effectiveness and success could not be claimed by individuals. At Valley High, where a student-teacher consultative relationship (based on the need to accomplish academic tasks and which appeared to transcend ineffectiveness in overall school management and co-ordination and lack of learning resources) was practiced, no similar feelings of control were felt by teachers. Yet it was doubtful whether or not Valley High's individual response achieved as much personnel's accountability as was observed at Inland High. It might be important to leave in the hands of teachers a certain amount of leeway to exercise control for the planning of what to teach and how to teach it and under what disciplinary behaviour to teach. But overall co-ordination of school activitity should not be relaxed in favour of teacher initiative, creativity and individual claim to efficiency. Every school's management should strive to reach eloquent co-ordination of its activity while at the same time, devising systems which would encourage the recognition and display of teacher and student individual initiative and creativity.

Evidence from Inland High would seem to cast serious doubt on the possiblity to have within the present perception of school management, parallel educational systems which equitably teach for achievement of both social and academic goals. Traditionally, high and sustained academic achievement has thrived in only those school environments characterized by clear and consistent routines, strict channels of communication, rigid discipline, strict observance of status and the availability of privileges based on seniority and status. Social skills and attitudes such as tolerance, democratic behaviour and others would seem to be nurtured and thrive only in environments where they are practiced. It would seem unreasonable to define students as responsible, if they consistently obey the bell with the threat of punishment looming overhead. The recent orchestrated calls for a display of these social qualities from school graduates, be they high or low academic achievers, is perhaps an indication that the system as a whole has reached the ceiling for optimal social teaching within the present predominantly regimented social organization of school. Recently, the educational system has made a new commitment to the teaching of technical skills in schools. Policymakers are demanding that every school within its own walls, provide 'a real' model of not only teaching but using technical skills. A similar but far reaching commitment would have to be made if schools are going to teach and use the relevant social skills in their everday work. A starting point might be the recognition of the fact that:

> "Socialization is never anything like a passive imprinting by 'society' upon each 'individual. ..Socialization does not just stop at some particular point in life; rather it must be seen as a time bound process within which an individual is both produced by and produces his/her contextual order", (Giddens 1979).

In other words, those who seek to socialize others, must themselves accept a certain amount of socialization in the process. Democracy, responsibility, leadership ability, being mindful of other people's welfare, tolerance, interdependence, confidence, and a scientific approach to problems are unlikely to be learned simply through ordering that such skills should be taught, and by talking about them. Every school head knows that a great deal of "talk" about these qualities has always been conducted at every parade and assembly. What is required is to set up management infrastructures in schools which not only work by the practice of these qualities but, perhaps, much more crucially, show why these qualities are essential in the development of all those who live in the school.

The school heads at Inland High and Valley High were described by teachers as "strong" and "weak" respectively. What did these descriptions mean and imply? The strong head's key achievement would appear to have been his ability to guide and direct the continuity of useful traditions and policies into a stable, workable and productive school system. The weak head was said to have failed to "continue" useful policy and practice for instance, in upholding a Christian ethic and work philosophy and in caring for school facilities and resources. These descriptions indicated the importance of continuity in policy and useful traditions in managing schools. What a strong head provides, is a model of strong leadership which leads to management stability particularly, if it creates expectations for high achievement and provides clear channels of communication and evaluation of work. This would seem to suggest that even in those schools without a history or traditions of academic excellence, improvement through management action is likely to come about, more quickly, not just through instituting particular forms of administration, but also through the creation of conditions and actions within the school that provide favourable expectations for high academic achievement, proper communication, constant monitoring of productivity and evaluation of academic work.

Elements of a weak leadership were observed to be numerous and inter-related. At Valley High, it was possible to isolate combinations of management actions with results that can be characterized as "draining" school personnel's energy through goal displacement. Such actions consisted of general unavailability of the head to school personnel at critical times; lack of command of basic management components; secretive financial management; use of dubious criteria in allocating resources; lack of a system for airing minor and major grievances; indecisiveness; too many concurrent activities; fuzzy goals; over-delegation of duties; and no fine-tuning of goals of schooling and education. It would seem therefore, that school heads need to be assisted to develop an encompassing perception of their own work, the school's work and goals and the needs of various personnel. In this endeavour there might be need to develop more realistic evaluation concepts of school management than those currently used. The following ideas based on what was regarded as what was regarded as good management practices in the two schools might form a basis for the development of new concepts:

1. Education, as defined in Kenya, has many goals. Yet academic achievement is perhaps disproportionately emphasized in public examinations and job selection. While in good management the multiplicity of goals is not explicitly truncated, underlying almost all the activities designed to work toward the achievement of these goals, is the deep dedication to the importance of academic achievement. This dedication permeates the total fabric of school life and culture so that in the final analysis, high academic achievement may be related more to the fact that it is a pervasive objective, than to the existence of more resourceful teachers with better teaching styles and with specific policies on how to remain at the top. If the achievement of social goals were to be more emphasized, schools would have to demonstrate a pervasive dedication to its importance, its implementation and evaluation.

2. Good management has an "openness' to outsiders and visitors of all kinds, including researchers and other schools. However, there is a clear educational policy to guide openness to outside experiences in order to permit an active flow of ideas and personnel in and out of school, leading to more effective and enlightened self-guidance. This openness also demands that those within the school be able to present ideas, air minor and major grievances, build support, repackage existing directives and devise ways of introducing small changes and press for initiatives in all aspects of change and growth.

3. Good management looks after its physical and financial resources properly. There is no doubt that because some high achieving schools were established a long time ago, they have had a long time to collect and replenish various physical and financial resources that are necessary for effective teaching and learning. But this is not always the case. At Valley High, despite the school's age and high achievement, the physical resources were quite poor and inadequately maintained. A general observation seems to be that times have been hard for everyone.The sentiments of school heads and teachers in high achieving schools with regard to their financial status and the availability of physical facilities and consumable resources, were succinctly summarized by the head of Inland High when he said:

> "Our success does not flourish because this is a situation of plenty. A major part of my work here, and that of teachers, is to organize for hard work amongst a shortage of many things".

Of course, this whole issue is tied up with complex issues regarding the perception of "adequate resources" by school personnel and the valuations they apportion to the degree of academic success that these adequate resources contribute to overall academic achievement. However, one observation needs to be reiterated with regard to financial resources. The easy access by teachers to information and knowledge of the actual available finances for running various school activities, reduces the amount of gossip, discussion and speculation as to whether or not school funds are being used wisely. Since corruption is a matter of great concern in Kenya, if school management can show that its funds are used legitimately, then discussion will probably turn to other issues, saving teacher time and psychic energy for perhaps, more productive areas of school work.

4. Good management anticipates and responds appropriately to crises created by scarcity of resources. Appropriate response means such things as improvisation, proper substitution and establishing an early warning system so as to avoid misallocation and wastage of time and resources during the actual implementation of the strategies to be adopted in responding to scarcity problems. Equally significant, the responses should not result in merely shifting priorities (such as buying food instead of textbooks), rather responses should attempt to at least, maintain the current level of activity and productivity with reduced inputs. In addition, good management has a clear system of acquiring the minimum basic resources be they finances, teaching-learning materials or teachers, and uses extra resources, wherever available, as catalysts and therapeutic devises. Furthermore, insightful management policies should set up clear directions in order to prevent acquisition - at very high cost - of "conspicuos" resources which have in reality little relationship to social and academic learning. And where such conspicuous but underutilized resources already exist, management should work out sensible ways for optimal utilization.

5. Good management, while allowing participation in decision making at all levels by school personnel, develops a personalized ideology on how to organize and do their work within the framework of centrally prescribed policy. However, good management goes beyond this. It takes centrally prescribed plans as guidelines which dictate the overall goals and spirit of the organization, but it formulates its own working policy, relevant to goals, needs and interests specific to the school and its personnel.

6. In poor management, the actual level of management efficiency is low. A characteristic of poor management is the multiplicity of simultaneous urgent problems in almost all aspects of a school's life as well as an assortment of personal problems facing members of staff of all categories and students. The "lives of crisis" are made more visible because the final authority to arbitrate, to give permission, to find substitute teachers, to supervise and inspect duties, and to solve all problems is the school head. In poor management, there is often no limit to the number of decisions that "only the head can make" This often means that the only duty the school head has no time for, is paticipation in discussion with teachers and giving genuine advice on instruction, performance and productivity of different departments. The larger the school the more the head - unless he concentrates on a few indispensable activities and policies- will be dependent on his own resources or the advice of a few friendly teachers or trusted students, and will therefore, rarely explore alternative solutions to the multiplicity of problems that will ultimately cripple both academic and social learning and achievement.

7. Good management, therefore, is characterized by proper delegation, in moderation and in conjunction with a co-ordination mechanism to gather, evaluate, disseminate and use information. In good management, the school head as the chief administrator recognizes the limits of his authority in carrying out supervision. School heads at secondary school usually have more control over financial matters, co-ordination of scheduling, discipline, and overall evaluation of the work of departments, than they do over the day to day decisions concerning what material will be taught, or how specific students will be treated. Even though heads have the mandate to supervise instructional processes, they lack the specialization, the skills and means to observe meaningfully the processes and outcome of teaching and learning. Under these limitations, a good head will delegate wisely

to heads of departments and individual teachers, providing support with discipline problems, improving teacher working conditions and handling resource allocation decisions fairly.

Throughout the discussion in this report, an analytical framework has been used to compare perspectives of individuals, policy, organization and action in two schools of comparable academic performance on public examinations. Student data from both schools have suggested that in situations and conditions where academic achievement appears to be optimal, social skills might be poorly catered to in the education of the elite. This observation might lend support to the assertion that the truly significant difference between schools that now achieve highly and those that achieve least in academic work, is not that the quality of real educational achievement is different, but rather that the difference is in the quantity of academic achievement measured by currently available methods.

There is a real danger in the longterm, in continuing to use only these measurement instruments to 'gauge total education' in both high and low achieving schools. The danger to high achieving schools lies in their current beliefs that since their students exceptionally well in academic work, they achieve equally well in the attainment of all other goals of education; and since students achieve highly within the school's strict and regimented organizational structures of roles, functions, time and curriculums, the schools do in fact, function at the most possible degree of efficiency. The perceptions of high achieving schools of the efficacy of the current prescriptions for their success could themselves become a major obstacle in working toward improvement.

The danger to the low achieving schools lies mainly in the general belief that the success of the high achieving schools is soley due to initial intelligence of their students at entry and not on what the school has done with the student since entry. This belief breeds several detrimental attitudes toward the work of schools and the variety of personnel in them. The belief takes the burden of responsibility and blame of the failure of students away from the inefficient and uncommitted managers and teachers, since the belief does not clearly explain where the school itself has failed. Rather, the belief leaves the responsibility for failure with the students themselves. The consistently poor achieving school often sits and does nothing concrete about improving, since unlike high achieving schools that have a name and tradition to maintain, the low achieving school has neither. The social existence of the poor achieving school depends not on how well its students perform but simply, on the physical presence of students in the school.

It was evident that even with just two schools, the educational ecosystem is so complex that a simple cause and effect concept breaks down. This should alert policymakers and professional educators to the need to develop more accurate images of the work of schools and the future of students. School appears to have contributed much to the changes of old customs and the development of new ones. Thus to retain all the current practices of schooling in their present form on the grounds of custom alone is unlike "schooling". For, as long as educational success revolves around the academic standards that students in different environments are trained to meet, ignoring social achievement, which the majority may or may not have mastered, education rebuffs students who cannot or have been made to believe that they cannot make the academic grade. Equally significant, this type of academic success deludes educators into thinking that high academic achievers - the elite - have made an equally high social grade. The students at Inland High did not appear to agree.

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Volume

2

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Teaching and Learning Biology in Kenya

Volume 2
Teacher Participation in Research for Professional Growth

Catherine Namuddu

March 1989

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TEACHING AND LEARNING BIOLOGY IN KENYA

Volume 2

Teacher Participation in Research for Professional Growth

Catherine Namuddu

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While acknowledging the generous intellectual assistance I have received during the conduct of the research, and in the preparation of this report, particularly, from Drs Sheldon Shaeffer and John Nkinyangi, I wish to point out that I am solely responsible for the views expressed, any errors, ommissions, biases and conclusions.

CN
May 1988.

Preface

Teacher inservice education and professional growth are activities undertaken to improve the quality of the teaching-learning process in classrooms and schools. But, all too frequently these activities are organized and conducted *for* teachers by experts or authorities who believe they *know* what is good for all teachers and schools and therefore, what teachers and schools should be doing. It is in accordance with such beliefs that new syllabuses, teacher guides and 'joint provincial' work programmes for various subjects are designed so that the teacher might have concrete directives to guide practice which is aimed toward change. But how useful do teachers really find these directives? And what factors guide the teacher in interpreting such directives? What is there in these directives and in the environments of various schools that might make change very difficult to accomplish? And, what kind of help do teachers really need in order to understand change and the demands it makes upon their work in and out of the classroom?

This report which is an account of the processes by which teachers come to achieve full participation in research and in discussion with other practitioners, addresses these and many other questions by revealing teacher perceptions and reflections concerning centrally derived curriculums and the decision that ultimately assemble, guide and characterize classroom processes. Futhermore, the heart of the report is the description of the reflective processes through which more meaningful professional growth and development of teachers may be brought about. Such processes are small scale, intensive, reiterative, time-consuming and practitioner centred as compared with lectures used in traditional inservice educational courses which are large scale, superficial, one-shot, economical and authority or expert centred. This report also presents data on the processes of implementing change in instructional strategies in various classrooms and schools.

The report should be of interest to teachers, educators, curriculum developers and more particularly, to agents for educational change as the data underscore the need to consider a whole series of factors before introducing ideas on change.

CN
May 1988.

INTRODUCTION

The research study, Teacher Participation in Research for Professional Growth, was part of a larger project on **Teaching and Learning Biology in Kenya** which had the following two aims:

1. **To identify practices which take place in schools and classrooms, and to contribute to an understanding of the nature of teacher perceptions and approaches to learning by students which result from these practices.**

2. **To understand the implications of teacher and student perceptions for school achievement and acquisition of general positive behavioural modalities.**

The overall research was guided by a theoretical framework derived from interpretive research methodology (Erickson 1973, 1980, 1986), with interest centred on exposing and clarifying the everyday human meanings in the life of schools. Emphasis was placed on understanding the immediate and local meanings of actions in education as defined by the points of view of school heads, teachers, and pupils. Teaching-learning, whether at school in classrooms or during weekend seminars, was regarded as an event with complex but interrelated processes and products, constructed by the various participants in the event. Processes and results of teaching-learning in particular instances and contexts, were seen as reflecting the phenomena and dynamics of education in wider society. Therefore, the processes, products and contexts of schooling in the arena of particular instances had to be understood if, classroom teachers, teacher trainers and policy makers were to be able to implement realistic intervention in schools, whether for the purpose of improving teaching and learning or for expanding facilities. In examining education as an interpretive process, it was assumed that a holistic perception of education in Kenya should address at least five key questions, namely:

1. **What is education as viewed by school heads, teachers, pupils and the broader society in the context of Kenya?**

2. **What are some of the characteristics of personnel and resources in Kenyan schools?**

3. **How do various school and non-school personnel actualize the purpose of schooling relatiive to their definition of education?**

4. **Where and how does education take place?**

5. **How should education happen?**

In the research study Teacher Participation in Research for Professional Growth, only relatively narrow aspects of each of the above questions were directly addressed. Teachers as key personnel in schools were regarded as not merely sources of research data, but as knowledgeable practitioners who, when engaged in serious dialogue and reflection, are capable of creating new concepts of their work in order to guide their practice. Consequently, this aspect of the research involved discussion, interviews and reflection among four teachers with the general goal of getting them to clarify perceptions of their work. The decision to involve teachers in participatory research was based in part, on the researcher's experiences as a teacher educator, and as a participant in curriculum development and inservice education for teachers. A brief discussion of these issues is presented in the first chapter in order to underscore the significance of teacher professional growth to educational change and improvement.

By involving teachers in the strategies of collaborative ethnography within the wider framework of interpretive methods, it was assumed that effective teacher professional growth is the result of intrinsic professional motivation to improve, and that this intrinsic motivation rests primarily, on the individual teacher and secondarily, on the curriculum. It was envisaged that intrinsic motivation to grow would be much more easily nurtured if a teacher was aware of what he actually did during teaching and how his teaching interacted with students. To work toward such a goal, a strategy based on identifying discrepancies between a teacher's standards of expectation and his actual practice, through discussion in seminars, was adopted. Seminars were designed to serve three purposes. First, they would provide a learning forum for new and workable practices. Second, they would increase motivation, nurturing experiences and public support from colleagues in order to identify teacher strengths, areas of maximum effect and elements of discrepancy between expectations and actual practice. Third, seminars would be a reference point in talking about and assessing the usefulness of implemented instructional change.

Teacher collaboration in research was undertaken at four levels. First, teachers were involved in aspects of planning for, and collecting data from students in their classes, rating the quality of their own lessons, and attending pre-active and post-active teaching interviews and other more general interviews. Second, teachers participated in seminars where they participated in reflective discussions of two main issues: the factors within their school environment which might affect their work; and, teaching practices as observed from video and audio recordings of their lessons. Third, teachers identified areas within their practice which they felt they needed to improve and using both their own ideas as well as suggestions from their colleagues, implemented instructional techniques designed to ameliorate selected teaching strategies. Fourth, teachers shared their experiences about participation in the research with a larger audience of Kenyan teachers with the aim of encouraging other practitioners to develop channels of dialogue among themselves that might lead to a wider debate on improving the quality of practice.

Data Collection and Interpretation

In collecting data, the five questions eliciting a holistic perception of education in society were viewed within a phenomenological framework. Emphasis and interest were placed not on frequency of teacher assertions of the frequency of events and phenomena related to the issues under discussion, but on types of meanings, the degree of importance of these meanings, and the degree of reciprocity and congruence of perspectives among personnel involved in situations and contexts of interest to teachers. Data concerning the following factors and issues were collected through participant observation, interviews, video recordings of seminars and from short open-ended questionnaires completed by teachers during each seminar:

1. The processes by which teachers come to achieve full participation in seminars as individuals and as a group of teachers from different schools.

2. The manner in which teachers learn to reflect upon their own practices through discussions and interviews and through general involvement in research.

3. The content of the actual discussions, which would reveal the teacher perceptions and concerns about the nature of their work in the classroom and the school in general, as well as the teacher perceptions of their involvement in the research and their reasons for undertaking various activities.

4. The points of view and suggestions generated by teachers and their reactions to various suggestions for change.

5. The processes of implementing change in instructional strategies in various classrooms and schools, the relationships between the types of implemented change, the nature of the implementation process and the resulting total environment in specific schools.

In selecting, analyzing and interpreting data, a conscious effort was made to emphasize the multiple meanings attached to the same issue by different participants. Similarly, there has been a deliberate effort made to provide as much background information as possible, for many of the activities so as to identify the rationale for undertaking certain decisions whenever they had to be taken. The various personal, organizational and situational constraints to the collaborative efforts have also been described so that in suggesting ideas on the viability of the strategies that were employed in this project for future teacher professional growth activities, such factors can be more adequately considered than was attempted in this research.

In reporting the evolution of this collaborative work, there has been less concern with identifying and documenting fast, dramatic, and ostensibly comprehensive positive change that are so often assiduously expected and sought from this type of a project, by funding organizations and policy makers. Unlike many donor-supported innovations for change, this work was not stage managed or innoculated against the myriad daily pressures (Court and Kinyanjui 1985) to which all teachers, at all levels of schooling work in Kenya are subject. For instance, the teachers in this project continued to carry out their heavy teaching loads and to fulfill their normal responsibilities in school just like their colleagues. One teacher was transferred out of the project schools during the life of the project so that a new teacher had to be 'inducted' into the research. Similarly, the reseacher continued to teach full time, and the added administrative burdens of the project only served to materially reduce any 'free time' which would have been for research. It can be concluded with certainty therefore, that whatever achievements, problems, constraints and failures were encountered, they were all genuine features likely to be encountered in naturally evolved projects of this nature.

The report is a reflective description of both the processes of involving teachers in the research as well as the products of that involvement. As such, data and descriptions are identifieded by teacher names and by first person pronoun for the researcher. The achievements, problems encountered and attempts to resolve them, constraints, and failures as they evolved through the collaborative venture are the central focus. The lessons from this collaborative effort are, in themselves, a powerful antidote to purge policymakers, innovators and agents for educational change, free of the illusion, that positive and durable change will come to the classroom without heavy sacrifices and commitment of time, funds, effort and genuine intellectual thought. Deep, intensive and consistent thinking about the quality of current practices is needed before new practices can be made increasingly effective through small, incremental and localized change.

The report begins with a chapter on some of the factors which influenced the development of meaningful teacher participation in the seminars and in research in general. Chapters 2 and 3 deal with the content of seminar discussion. Chapter 4 discusses strategies and problems of implementing instructional changes in classrooms. In the last chapter, the implications of the results of teacher participation in research to the wider issues of education, research and teacher training and upgrading are discussed.

Chapter 1

EVOLUTION OF MEANINGFUL TEACHER PARTICIPATION IN RESEARCH

Perceptions of Teacher Classroom Practice

Few other aspects of the Kenya education system receives more attention from the public than the link between the quality of teachers and student achievement on public examinations. It is frequently stated in public meetings and newspapers that a 'good' teacher should control student discipline, conduct effective teaching and lead his students to high academic achievement. This idealized image of a teacher as "a smart, knowledgeable and inspired intellectual...a critical educational authority...with a sense of professionalism...and empathy for his students" (Lightfoot 1983) is however, rarely accorded to classroom teachers. Instead, teachers are often described in steoretype portraits that suggest that they are lazy, ignorant, resistant to change, pedantic and lacking in substance and resourcefulness. As a result, speakers and authors in public forums advise teachers on how to accomplish the job of teaching properly.

There is no doubt as to the frequency and abundance of advice given to teachers and schools by Ministry of Education (MOE) planners, policy implementors, university teachers, curriculum developers, officials of the national examination board and the ubiquitous "general public". Equally evident from the same foraums are sentiments that suggest that many schools and teachers have not heeded the advice, and are, if anything, regressing rather than progressing toward positive change. It seems therefore, that schools and teachers may be bombarded, day in day out, with advice and criticism, yet they are unimpressed. Why? How do teacher perceive this advice for change?

During the planning of this research project, the possible causes of neglect by teacgers of professional and 'public opinion and advice' on teaching and general educational change was explored at two levels, namely by reviewing the history of curriculum change and teacher inservice education; and, by surveying the perceived credibility of proponents of change by practitioners.

New Curriculums and Teacher Inservice Education

During a conference on Teacher Education in Eastern Africa in 1971, Mazrui (1971) had observed that every educational reform proposed in Africa for the past 20 years had increased the demands made upon teachers in terms of time, effort, commitment and intellectual development. Mazrui described how innovations and changes in the total educational sytem, --- such as: vocationalization of the curriculums; decentralization of the syllabuses; shift away from national examinations at every class level of schooling to continuous assessment; and the integration of production and education -- had all demanded more time and work from teachers whose workload was already excessive in a general situation of meagre incentives. At the end of the discussion Mazrui had posed a crucial question: Can teachers prove equal to the task?

During the 1970s, many countries in Africa had developed new science and mathematics curriculums at all levels of learning. The new curriculums were predicated by the discovery approach to learning, as opposed to older curriculums using more didactic approaches to teaching. The discovery approach attempts to combine an emphasis on experimentation, hands-on experiences, student talk about their observations, and their explanations for experimental situations, with teacher use of explanatory strategies that should help students change their experientially based ways of thinking about natural phenomena to more scientifically appropriate ways of understanding phenomena. The didactic approach however, is characterized by verbal and/or textbook instruction as main sources of facts and information about science with emphasis on giving and getting the right answers (Webb 1980). Consequently, programs of teacher inservice education were established in order to update teacher skills.

While in many countries secondary schools had been given an option either to begin the new curriculums or to continue teaching the traditional programmes, the total education system was permeated by an air of uncertainity among teachers as to the usefulness of the proposed changes. By 1977, many of the new curriculums had been abandoned, others had been greatly modified and a number had never actually taken off the ground.

Without the benefit of consistent monitoring of the design and implementation of these curriculums, and without systematic evaluation of the impact of such curriculums in schools, teachers, learners and policy makers were generally unclear about why many of these projects had been abandoned, and whether or not the projects had been useful in any respect. Piecemeal attempts to evaluate aspects of these curriculums appeared to have generated two unequivocal observations. While the use of the discovery approach had been demonstrated during inservice teacher education courses, teachers did not seem to have transferred the new knowledge to their classroom. The teaching-learning approaches of inquiry, independent student discovery and self-direction did not seem to have become actual everyday practices of learners. Why?

At the specific level of new curriculum implementation, it appeared that the proponents of the discovery approach and the developers of new curriculums had overlooked at least, three fundamental factors. First, given the long syllabuses, meagre instructional resources and aids, large class sizes, and the nature and influence of public examinations, verbal instruction and didactic approaches were likely to continue to be extremely important strategies in giving facts and demonstrating skills in spite of new curriculums, purporting to be based on superior cognitive approaches. Second, the curriculum developers and those conducting teacher inservice education courses had assumed that the classroom teacher saw the need to change his approach to the teaching- learning process. As a result, courses had been presented with little reference to needed change in teacher attitudes and perceptions. Third, the policymakers seemed to have similarly, assumed that mandating and legislating change would result in actual change in classrooms, and thus did little to monitor the implementation of new curriculaums so as to be able to discover teacher interactions with it.

At a more general level of inservice teacher education, there is doubt regarding the effectiveness of top-down inservicing strategies. Traditionally, teacher inservice education has been much more concretely linked to the implementation of new curriculums than with attempts to diagnose difficulties in ongoing teaching practices for the purpose of helping teachers become more effective with existing curriculums. As a result, teachers have often seen inservice education as a process whereby they are told by some authority what they should do in their classrooms. While there may be room for this type of inservice education, it does not provide or increase a teacher's capacity for autonomous professional self-development. Professional growth is more likely to be nurtured through systematic self-study and the study of the work of other teachers through the testing of ideas by classroom research procedure (Stenhouse 1975). Moreover, the traditional inservice strategy (where for instance, particular biological concepts, such as ecology, are selected for re-analysis and re-structuring in search of an "easier" way to present the concept to learners) is not only laborious and inefficient, but also such a purely empirical attack on the problem of professional growth, that it affords the teacher little opportunity to work towards building a general theory of professional growth that can affect a greater variety of his overall tasks as a teacher(Shayer *et. al.* 1981) Although Teaching and Learning Biology in Kenya was not a curriculum project, it did recognize that in order to bring about improvement in the teaching-learning process, it was crucial for teachers to become convinced of the need for change.

Credibility of Proponents of Classroom Change

In surveying the perceived credibility of proponents of change by teaching practitioners, the following two questions were put informally to 42 teachers in 6 schools:

1. **What do you think of the advice and criticism levelled on schools which is heard on radio and read about in newspapers?**
2. **Do you think schools and teachers make an effort to improve after they have been either advised or criticised?**

In asking these questions, each teachers was shown a folder containing 15 newspaper clippings illustrating some of the advice and criticisms given by various MOE officials and writers to newspaper editors (see samples in Appendix A). To iattract the teacher's attention to the contents in the clippings, three types of information had been underlined in the text of each, namely:

1. **The name, rank and institutional affiliation of the author or speaker.**

2. The specific advice given and the aspect of schooling the advice was expected to affect, and the positive aspect its implementation was expected to achieve in schools in particular and in education in general.

3. The specific criticism levelled, the personnel named as culprits and the behaviours they were said to indulge in and which constituted bad practices.

To the first question concerning the validity of the criticism or advice given to schools and teachers, the majority of teachers (34) gave a short curt answer, "nonsense". On the issue of the credibility of the speaker or author, many teachers would request to look at the clippings more closely before retorting, "Who is saying that? Ah- that one! He doesn't know what he is saying". On the question of whether or not schools and teachers make an effort to change, the most frequent reply was, "change? these people should leave us alone. They should do their jobs first and then come and tell us how to do ours and change".

Only one teacher, a school head, gave a slightly different response. To the question on validity of advice he stated:

> "Obviously something has gone wrong with our schools. But I doubt whether we have to start with the schools and end there. I think the problem is really our fault- all of us as a nation."

To the question of whether or not schools make an effort to change when advised or criticized, he stated:

> "If every time I was criticized by the newspaper, or even by the boys and teachers here I changed, we would never have a single consistent directive in this school. We find it hard enough to get all the students to do what they know is expected of them all the time. Imagine what problems we would have running a school if the students did not know what is expected of them. These students or teachers who do not do what they know is expected of them are just waiting because they think the rules are going to change - today - tomorrow - everyday. The newspapers only give courage to those who just sit and wait"

Teachers often debated the merits and demerits of the arguments, advice and criticism in the newspaper clippings leading the discussion eventually to the usefulness of research. Teachers evolved three main reasons why advice on instructional strategies often emphasized by university staff and MOE officials was regarded as relatively lacking in credibility in school situations. First, teachers pointed out that many university staff did not have teaching experience at the high school or primary school level, so that they did not possess the necessary and tangible experience to form a good foundation for advice and criticism on teaching practices at those levels.

Second, teachers claimed that some university teachers and MOE officials who formerly taught at primary and secondary schools, did not have a long and sustained experience of working in schools. They urgued that such personnel were people, "Who got an early chance to run away from teaching and join other institutions". As for those who might have had a reasonably long teaching experience, teachers argued that they did not consider such service as exemplary or distinguished.

Third, since many teachers had serious doubts as to the procedures of selection of and the quality of successful candidates for entry to postgraduate work at university (teachers stated that some people enter into higher degree courses 'very easily') and to policy making positions in the various MOE departments, teachers also doubted the suitability of such personnel as advisors to classroom teachers.

In general, teachers regarded professional teacher educators as not only 'outside' the teaching profession but also as possessing little credible and legitimate knowledge of schools and classrooms as derived from the daily sweat, frustration and toil of classroom teaching. Three factors seemed crucial to teachers in their evaluation of the credibility of advisors, dispensors of criticism and change agents, namely: possession of legitimate and authentic teaching experience for a sustained period of time at the relevant level of schooling; teaching experience of a cross section of schooling levels; and rising legitimately through the ranks of the academic ladder, the teaching profession and at policy making levels. These three factors would seem to indicate that in order to understand teacher perspectives of their work, and to work towards improving practice, teachers have to work with people they consider believable professional colleagues.

Definition Of 'Good' and 'Bad' Practice

The preceeding brief discussion of 'public advise and criticism' and teacher perceptions of their credibility, reveal a one-dimensional assigning of meanings to phenomena that is so characteristic of personal perspectives. On one hand, the 'public', in issuing advice and criticism to teachers, rarely considers that teachers may often be caught in an impossibly unresponsive and uncaring situation, where they feel victimized by 'the system'. In such situations, teachers might define the 'goodness' of their practice not just in the narrow sense of good student test scores, but also in a broader concept of successful teacher survival in uncompromising school environments. On the other hand, teachers, in dismissing the validity of most of the advice and criticism, hardly recognize the fact that professional educators, non-educationalists and the public, besides having a rightful high stake in education as citizens, might have an authoritative command of the phenomena of teaching that inspires their persistent interest and commitment to improvement. Two examples, the first from teacher training and the second from research, illustrate some of the actions and attitudes which build and maintain such one-dimensional perpectives.

Practices at Pre-service Training

During undergraduate student practice teaching supervised in 1981, a tutor was asked to supervise two pre-service trainees in biology on the same day in two high schools. The first lesson held at 8.15 a.m. was at City High, a 'good' suburban school. The second lesson held at 2.00 p.m., was at South High, a 'poor' rural school 45 kilometres from the first school. When the tutor arrived at City at 8.05 a.m., a guard, at the entrance, directed him through the school complex to the pre-service trainee laboratory. A laboratory technician was assisting the trainee to put the last of the required materials on student benches. At each of 15 locations, there already were a rack with 6 test tubes and three petri dishes; the first containing a white powder, the second groundnuts, and the third, egg albumin. Each location, with a sink and a water tap, also had a bunsen burner under a tripod stand and three dispensing bottles with Millons Reagent, Benedicts Solution, and distilled water, respectively.

Students, all boys, arrived promptly at 8.10 a.m and quickly settled at the 15 locations by two's or three's. The trainee handed each student an instruction sheet on food tests, and briefly explained the procedures - using the sheet and demonstrating with a set of apparatus from the teacher's desk. After the 'OK, start', all students were on their feet doing the experiements. At 8.20 and 8.30 a.m. a second and third tutor arrived respectively, to supervise the same trainee. At the end of the 80 minute lesson, the three supervisors completed their lesson evaluation forms, talked to the trainee and discussed politely each supervisor's point of view on the lesson. One tutor had awarded the trainee 9/10 "because everything was excellent", a second tutor had awarded 7/10 "because some students who had finished their work early had wasted too much time being idle"; the third tutor had awarded 5/10 "because the teacher had done almost nothing, almost no teaching, since there was a detailed instruction sheet, and it was the students doing all the work".

At 1.45 p.m. the tutor arrived at the small town near South High. It had rained in the morning and it was impossible for cars to negotiate the downward 'path' leading to the school. The tutor pulled into the roadside and walked down the school path. Approaching the school, he saw a car belonging to another tutor which was being pushed out of a ditch by about 10 boy students. The bell for the beginning of class had rung three minutes earlier. The teacher trainee led the tutors to the 'laboratory' - a 60 feet by 20 feet rectangular cement box with a corrugated iron triangle as roof. Three small unlighted bulbs were suspended from each of three uneven beams spanning across the ceiling. It was dim inside the laboratory but some light came through the window and the rest filtered through the numerous holes in the iron roof, caused by the removal of too heavy gauge nails that had probably been taken out because they had originally been hammered into an empty space without a wooden beam underneath to hold them. There were six tables of unequal height that served as student work benches. In one corner stood a large gas canister with four bunsen burners on a table connected to it. The floor was a soggy and muddy pool of dirty water. There were 15 students seated with hands folded to their chest in total silence.

The trainee gave the tutors a copy of his lesson plan. The students were to observe mono- and di-cotyleadonous leaves. The available five hand-lenses were distributed one to each bench. At 2.15 p.m. three students walked in followed by another group of three at 2.30 p.m. From then up to almost the end of the 80 minute period, other students trickled into the lesson until all 42 were assembled. The trainee took 30 minutes to go over the instructions and when he finally asked students if they had any questions there was no response. When he asked whether all students had understood the instructions there was still no response. The trainee asked the students to start their work. As students collected the 4 specimen of leaves from the front bench, the trainee moved around the room urging students to start and to "hurry up to do something". The sound of the terminal bell was a relief to everyone.

Outside the laboratory, the two tutors got hold of the trainee, and demanded to know why he had allowed students to trickle into his classroom. They complained that: the laboratory was dirty; student uniforms untidy; and students not fully involved in the task of the lesson. The tutors threatened to return the next day to supervise the trainee and that they expected improvement. During a subsequent discussion, one of the tutors, who had awarded 4/10, stated, 'that was no lesson. The teacher did all the talking." He was suprised to discover that his colleague had awarded 7/10 and asserted, "you must have been sleeping throughout the lesson. Nothing happened in that lesson that would deserve even a 2."

An equally dramatic illustration of the one-dimensional perspective was observed to be at the centre of a controversy between a tutor and a trainee after the former observed a geography lesson. During the lesson, a student had posed a question to the trainee, but instead of giving an answer, the trainee had put the question to another student. The second second student had not only been unable to answer correctly but was also unable to re-state the original question. The trainee then told both students to look up the correct answer which they were expected to explain during the next subject lesson.

The tutor argued that he did not regard "throwing a student's question back to the class" a good strategy, ever, adding that it was unprofessional for a teacher not to answer a student's question within the duration of a particular lesson. The trainee's "defence" was that while he agreed generally with the tutor's arguments, he thought the context in his class was important. The trainee had pointed out that the question asked by the student had already been exhaustively dealt with, but because the student was often inattentive, he had missed the explanation. The trainee had added that he had given the question to the second student because he too had been inattentive, explaining that his requirement for the two students to look up the answer and then give an account of it during the next lesson, would encourage students to be more attentive in class. The tutor's uncompromising stance was reflected by his refusal to change his original grading of 5/10.

These examples suggest that 'rating' of classroom observations from the tutor's perspective often ignored the possible influence of the overall context of a school on the conduct of particular lessons. For lessons at City High and South High, five tutors, using the same standardized rating method, but relying on different perceptions, gave varied interpretations of the same lessons. More significantly, tutors were rarely able to listen to each other, let alone, to the trainee's interpretation of the events and the contexts of lessons. Many tutors simply refused to take into account the trainee's interpretation in rating the lesson or in suggesting strategies for improvement. For instance, during discussion at City High, a tutor had pointed out that he had noticed some confusion among a group of students as they started to do the experiment. The tutor had wanted to know why the trainee had not ensured that every student had understood the instructions before letting the students continue on their own. The trainee had explained that since all the boys in the class were bright, he had decided to encourage them to get started by trying to understand some parts of the procedures on their own and work out emerging problems by talking among themselves. The tutor had called the trainee's explanation " an excuse". Similary, at South High, the trainee when asked why he did not encourage students to ask questions, had explained that, "in this school few students ask questions". But tutors had insisted that the trainee was simply not trying hard enough.

Class Observation Research

During 1980/1981, a short term study of the structure of teacher communication was carried out in 15 classrooms in secondary school biology in Kenya (Namuddu 1981). Part of the data was collected through a questionnaire designed to discover the relationship between teacher' perceptions of their lesson organization and planning and the actual interactive practices they engaged in. Overall, teacher theoretical perceptions of the organization and planning of their lessons were found to be extremely incongruent with what they were actually observed to do during lessons.

For instance, while all teachers had a specific topic for the day's lesson, none had specific objectives for the lesson besides "teaching the pupils on the topic of...". All teachers had said that they had stated their objectives to the class although none had actually said more than the expression "we are going to talk about...". All teachers had indicated that they had stated their objectives at the beginning of the lesson - because they "believed that pupils ought to know what the teacher is going to teach". None of the teachers had suggested that the students ought to know what they were going to learn. Teachers identified no specific skills they expected the students to obtain from particular lessons except "to learn the main points". All teachers had stated that the main factors influencing their lesson preparation were what had been taught before and the level of student knowledge. All teachers said that they always sought to point out to students some relationship between particular lessons and lessons that they had taught before. Yet in only one of the 15 lessons was this relationship mentioned in the course of the lesson.

Teachers pointed out that they invariably planned their lessons basing the sequence on the nature of the topic using a stepwise treatment of the content according to its increasing conceptual complexity and demand. They were unable to state other sequences which they could have used and indicated that their classroom discourse rarely varied from their pre-interactive lesson preparations. One of the most interesting aspects of the teacher responses concerned their rating of student participation and what teachers did in following up student questions and answers. No teacher rated the amount of student participation as being less than 40% of total lesson discourse and many rated student participation as high as 80-90%. Teachers had no specifc comments on what had transpired after student answers to teacher questions - apart from the expression that many students had answered questions correctly.

When teacher overall responses were compared to two other forms of data-a theoretical questionnaire on 'good/bad' teaching strategies, and transcripts of actual classroom observations, the following two conclusions were reached:

1. Teachers 'knew' the theoretical expectations of good instructional practices but their classroom paractices did not reflect the use of this knowledge.

2. Teacher perceptions of what actually took place in their lessons was out of touch with the observed reality.

The observations from pre-service and inservice teacher education as well as from classroom observation research suggested two hypotheses:

1. Theoretical expositions of pre-service teacher training courses might be out of touch with the classroom situation.

2. Teacher theoretical concepts might not be out of touch with the reality of what actually happens in the classroom, but teacher definitions of the components, quantity and quality of this reality was simply at variance with observer definitions and interpretations.

The first hypothesis suggested that while there might be a 'core' of good teaching practices and strategies that pre-service teacher training can impart, unmitigated prescription and expected usefulness of these strategies in all types of contexts and situations of classrooms and schools was limited by lack of understanding of the contexts in which the so-called 'bad practices and strategies' transpire.

The second hypothesis suggested that while the 'good practices and strategies' might be good and useful in all classroom contexts, teachers might not be sufficiently motivated to implement and use such practices for improvement for at least, two reasons: First, as earlier observed, teachers may find themselves in school and classroom situations where more time and energy is spent inventing strategies to subjectively impose coherance to a given situation than to objectively re-enacting college prescribed 'modes of procedure'. Second, as pointed out during the dicussion on teacher regard for 'public advice and criticism', while 'good practices and strategies' may be good and useful in all classroom contexts, teachers are not sufficiently impressed by the proponents of such 'good practices' to regard the strategies as workable in the classroom.

Deriving a Research Participation Strategy

The factors surveyed in the foregoing discussion, namely: effectiveness of traditional models of teacher inservice education; concepts of classroom practice by teachers; credibility of proponents of classroom change among practitioners; definitions of 'good' and 'bad' teaching practices; and the building and maintaining of one-dimensional perspectives on teacher practices, determined the research participation strategies and procedures adopted in the research at four main levels. The first level is the choice of a guiding framework for interaction between teachers and the researcher; the second, choice of schools from which participating teachers would come; Tt third, the management of seminars; and the fourth, the collection of classroom data to be used during seminars.

Teachers as Participants in Research

Until quite recently, the teacher role in research had deteriorated into a passive one of merely giving permission to be studied (Conlin1980). Secondary school teachers in Kenya were no exception. However, over the past decade, teachers particularly those in schools within easy access to the major urban centres, have frequently participated in research. In addition to often being the subjects of research, many teachers have acted as major sources of data on all aspects of school organization, administration and the nature of pupils. However, due to the types of research conducted, and the nature of the teacher work schedules, teachers rarely get an opportunity to be part of a sustained research effort that has as its primary goal, not simply the involvement of teachers in data collection alone, but also in the understanding of the teacher perceptions of this involvement and its effect on the teacher practices. This project, for several reasons, used the stategies of collaborative educational ethnography between the researcher and four teachers directly affected by the rest of the research project, as a means of both generating research data and instructional change strategies (Erickson 1977; Florio and Walsh1980). First, it was important to consider teacher inputs as essential in clarifying and checking the validity of observers interpretations of instructional goals and actions (Wallat and Green 1980; Green and Wallat 1979). Second, it was felt that teachers also need to extend their own knowledge base as well as assume new roles as extended professionals (Hoyle 1975; Stenhouse 1975). Therefore, the four teachers were engaged in long term participatory research processes so that they could reflect upon their perceptions and practices, derive motivation for professional growth, and effect methods and strategies for improving teaching and learning in their classrooms

Furthermore, awareness among teachers to perceive change as important and necessary was to be built around a system of identifying problems and possible strategies for change, by teachers themselves, through reflection on the mechanisms of research and the nature of their teaching. Using ethnographic methodologies assumed that teaching is context specific (Cook-Gumperz and Gumperz 1976; Erickson and Shultz 1977) which in turn, implied that teacher effectiveness was also context specific. The research format consisting of discussion in seminars was expected to provide the right climate for free expression among teachers so as to reach what Frere (1981) has described as critical conciousness. It was felt that teachers were unlikely to implement longterm and lasting instructional improvement in their work without prior and in-depth consideration of and reflection on the personal and social factors that affect individual practice and its effectiveness.

Selection of Participating School

Because of various organizational constraints, it had been decided from the project's inception to have a small number of schools and teachers, six and nine respectively in the total project on Teaching and Learning Biology in Kenya. Only four of the six schools and four out of nine teachers were selected to participate in the teacher development seminars. In selecting the four schools, it was recognized that there was in Kenya a vague definition of and a clamour for 'good schools' as determined by the quality of student performance on public examinations. The schools selected therefore, reflected differing levels of educational excellence in Kenya. The four schools, given the pseudo names of: National High, Provincial High, Disctrict High and Urbana High, were selected from a range of locations in Nairobi and Kiambu Districts. National High and Provincial High were old, government maintained and high achieving schools with an intake of students from all parts of the country. District High which had average performance, was a relatively new, government assisted school and selected its students from the surrounding farming and small entrepreneur community. Urbana High which had poor performance, was an old school of relatively recent African management, government maintained with an intake of students, the majority of whose parents either owned small businesses, or worked in factories and in the lower rungs of the civil service ladder.

Selection of Teacher Participants

At the time of negotiating entry into the schools for the entire project, it was expected that perhaps only interested teachers would participate in the staff development seminars. However, the initial decision rested on the school head. It is quite possible that in one of the schools the teachers who eventually took part in the project did so at the request of the head, but other factors came into play. At **National High,** the head of school directed that inquiries be made with Lydia, the head of department, who expressed interest in joining the project. Although Lydia discussed the matter with other biology teachers, none of the remaining four was enthusiastic after it became obvious that sacrifices in terms of teacher time during weekends, would have to be made for three years.

At **Provincial High,** the school head also directed that High, the head of department, be consulted. Hugh immediately appointed himself to participate in the project. As head of department, he said, he had no reason to refer the matter to the rest of the staff, even though he would inform them about the project. At **District High,** the school head selected Dalia to join the project, stating that she was the best and most experienced biology teacher in the school. When it was suggested that there would be no problem if a less experienced teacher participated in the project since the aim was improvement, the head first asked for the names of the other schools in the project and then explained: "we do not want a teacher who might let the school down in a research project involving schools like those". The head said that Dalia was not only a good teacher but that she was also committed to her work and that of the school.

At **Urbana High,** five attempts to meet with the head of school to discuss the issue had been unsuccessful. However, on three of these visits discussions had been held with Charity, the head of department of biology, who indicated that she wanted to participate in the project. On two of these visits, discussions had also been held with the deputy head of school who agreed with Charity on her participation in the project but advised her to seek final approval from the head of school.

Tackling Image Building

Two factors had been consistently brought up by teachers during the pilot phase discussions of methods used in the total project, namely, the images of researchers held among teachers, and the perceived usefulness of research to school processes and practices.

First, at a meeting to discuss school work at District High during the pilot phase, a teacher had stated;

> "Discussing with teachers and understanding what happens in schools and classrooms is useful if you want to write a thesis to get a degree. But to the rest of us it is useless, since most people who work in schools already know what happens in schools. And those who don't work in schools have in reality little interest in what happens in schools as long as the students pass the examinations".

This statement summarized the major points of contention regarding the usefulness of research to the classroom teacher; the image of researchers; the 'real' use of research data and results; the relationship between knowing and using that knowledge; and the nature of interests of outsiders in school matters and by implication, the problems which have to be faced in bringing about change in schools. The frequent but casual exposure of teachers to the conduct of educational research in their schools had conjured up two popular images of researchers, namely: image builders and collectors. The first image, less often quoted than the second, depicted the researcher's role as that of collecting information about the school with the ultimate aim of creating evidence in order to display a good or bad image of the school in the eyes of the public. The second impression of collector, more often implied by veiled politeness, was clearly disapproving and perhaps, more damaging in the long term. This image depicted the researcher as a collector and a busy-body who wasted school time, teacher time and student time, gathering data merely to store it away in a thesis or some obscure document. The researcher was perceived as basically selfish (aiming to get a higher degree for his own promotion), with little understanding of schools, and with interest in the most trivial aspects of school life.

Second, teachers were highly doubtful of the capability of individual teachers and researchers in specific institutions, to precipitate real change in schools. Teachers frequently pointed out that since teaching at secondary school was conducted by many specialist teachers, improvement in overall school achievement was unlikely to come about by strategies involving only a few teachers (Namuddu 1984).

Since it was unlikely that the four teachers who were to participate in the teacher development seminars would be immune to such contentions, it was important to tackle image building by working out ways and procedures during the seminars, which would address these perceptions. It was realized however, that changing such images, contentions and beliefs had to be a long term purpose of the teacher development seminars and not something that would be disposed of in the first or or second seminar.

The First Teacher Meetings

Lydia, Hugh (replaced by Lloyd during the second seminar), Dalia and Charity took part in the first meeting held at Provincial High. The purpose of the meeting was to acquaint teachers with one another and for the researcher to explain the nature and purpose of the research project in general, and the teacher development seminars in particular. The first and second meetings were uneventful. Even though teachers had several questions about their involvement in the research, these questions concerned mainly the structural and functional aspects of research procedures and not the conceptual issues concerning teacher development. Teachers had not had an opportunity to try out the activities they were expected to undertake and thus no serious points of debate or disagreements had yet arisen. At the end of sthe econd meeting, teachers agreed to launch the research in each of the four schools. In this process, each teacher was expected to undertake the following activities in his school:

1. Be available for lesson planning interviews and discussion after lessons taught in the research class; prepare lesson plans for all biology lessons taught, but particularly for the research class; and have copies of the lesson plans on file so that they could

be inspected whenever the need arose.

2. Keep a record of biological concepts that the teacher thought were difficult to explain or which he thought students had grasped poorly.

3. Keep a journal of school events, such as new administrative directives, official visitors to the school, and all activities undertaken in the biology research class which were different from normal daily teaching (tests, field trips, punishments etc.).

In addition, general procedure for the conduct of subsequent seminars was agreed on, consisting of four main activities:

1. Teachers would complete a form that solicited information on the three research activities undertaken in the school. The purpose of the information would be to generate material and issues for future seminar discussions as well as to gauge the stability of teacher activities and their perception of their student abilities over time.
2. Teachers would conduct a sharing a session. Here teachers would give brief talks on educational issues of importance in either specific school situations or in a wider context of the educational system. After each presentation, there would be a brainstorming session to compare the rationales for related practices in different schools.
3. Teachers would view a segment of a video taped lesson taken in one of the classrooms of the four teachers. Teachers would be expected to identify either effective or problematic teaching episodes and discuss them exhaustively.
4. Teachers would evaluate the different parts and methods of both the seminar and the research activities in which teachers had conducted. Teachers would also indicate which ideas and suggestions from the seminars they thought they might wish to pursue further or to implement in their teaching and when they would be likely to start such implementation.

The First 'Real' Teacher Development Seminar

When teachers arrived for the first 'real' teacher development seminar at Kenyatta University in November 1982, their first activity was to record all the research activities they had conducted in their schools during the previous three weeks. None had notes to refer to. Charity and Lloyd completed the forms quite quickly, while Dalia slowly pondered over hers, as she jotted down points. Lydia was able to answer only one of the questions regarding whether or not she had given a test during the three week period.

At the previous meeting, Dalia had been appointed to lead the first sharing session on the general topic of punishment in school. This got off to a very good start with Dalia describing the kinds of punishment instituted at District High, the student misbehaviours attached to each punishment, how often punishments were generally enforced, the opinions of students about these punishments and Dalia's own feelings about giving any of these punishments. Soon a debate arose as to whether or not student punishments were also punishments to teachers since they had to supervise the execution of such punishment. Charity and Lloyd regarded school punishments as merely correctives for the unacceptable behaviour of students while Dalia and Lydia regarded student punishment as infringing on the 'free time' of teachers and teaching strategies. This debate lasted two hours. Meanwhile, I was looking at the clock, worried that teachers might never get to what I regarded, at this stage, as the most important activity, namely, viewing a video tape and identifying effective and non-effective teaching episodes.

After the lunch break, I was able to get teachers to view a video tape of Lloyd's lesson. At first there was a great deal of excitement as teachers saw a class in action. There were numerous questions to Lloyd about the class, uniforms, the laboratory, notebooks, making notes and several other questions, all of which I regarded as peripheral to my central purpose of identifying effective and non-effective episodes. By the time questions subsided, Lloyd was sitting at the edge of his chair, chin in hand and absorbed in his lesson. The other teachers were now checking the clock, throwing furtive glances at both Lloyd and the three other video tapes containing recordings of their own lessons. At this point, the meeting was perhaps, mercifully interrupted by afternoon tea.

During tea break, Dalia commented to Lloyd, "when we go back, we are also going to see ourselves. You have had enough". On returning to the seminar room, I took the cue from Dalia's comment and 'showed' the other three lessons. changing to a different lesson whenever teacher questions regarding a particular lesson began to subside.

In evaluating the research in general, and the seminar in particular, teachers wrote vaguely about the sharing session, praising Dalia for her "wonderful" presentation. Teachers made positive comments about the food, the video lessons but said nothing about the kinds of activities they wished to undertake in future seminars. I then described the nature of the research activities that teachers had to undertake before the end of the term, and at this point, Lydia asked me how I had evaluated teacher performance during classroom observations, and during the pre-active and post-active interviews and from the seminar that day.

I had pondered with a certain measure of ambivalence over the possibility of such a question since it concerned a difficult issue at the beginning of a longterm project. On one hand, I was aware that if I told teachers my truthful observations, some of which were not very cheerful, they might be tempted to 'stage' data for subsequent observations. On the other hand, if I simply praised or overrated their performance at this early stage of the project, there might be little prospect for change in the future. More sigificantly, I would not be practicing honesty in generating and talking about research data, something which I was demanding of teachers. Consequently, in answering Lydia's question, I took a critical look at what had so far happened in the research project in general, and during the seminar in particular, and described what it had all meant to me. Teachers were "shocked at the little things" I had observed and which they had not thought about as important or meaningful in their work. Teachers attempted to "defend" themselves by reference to theory, practice, experience, the nature of schools, the rules and directives in schools, personal preferences and several other factors. At the end of the seminar, teachers left in a rather deflated mood.

'Repairing' the Participation Strategy

In retrospect, I realized that the first two meetings had been very deceptive. They had given the impression that the goals of explaining the nature and purpose of the project; of making each teacher aware of the benefits to him of participating in the project; and identifying each teacher obligations to the project; had been accomplished. Reflecting on teachers' "defence" propounded during the third meeting, it was evident that teachers were concerned about six factors which the first two meetings had failed to address properly, and which were now the focus in the re-evaluation by teachers of their participation in the project. The six factors were:

1. The reseacher's' 'real but unstated purposes for soliciting data from teachers.
2. Rationales and strategies for sharing the time burden among all participants, including the researcher.
3. Timing of collection of research data in individual classrooms.
4. Credibility of all participating schools for purposes of advising on instructional improvement.
5. Processes and procedures of arriving at consensus.
6. Techniques for participation in various seminar activities, particulalry video tape viewing, analysis and evaluation.

The 'Real' Purpose of Why

During teachers' defence, it was repeatedly pointed out that I had merely stated that I wanted to understand what teachers do during teaching, without disclosing what I really wanted to find out about their work. By this statement, teachers implied that the objective of understanding what teachers did, could be sufficiently fulfilled through classroom observation and need not include teacher interviews and seminars. This sentiment was related to teacher perceptions of the dubious usefulness of research conducted by 'collectors' and it underscored the importance of resolving their scepticism about pre-active and post-active lesson interviews which were concentrating on finding out 'why' teachers did and decided as they did during teaching. Teachers had interpreted questions about 'why' as evidence that I was not simply interested in understanding, for clarification, but was in fact, challenging the quality of their practice.

This scepticism was related to teacher belief that what teachers did during teaching was so self-evident that they were unware of the necessity to explain the rationale behind their actions. It was not possible at this early stage to resolve teacher scepticism about my real research objectives in order to convince teachers of the importance of discussing rationales. But I was alerted to the need keep a visible record of teacher discussions, reflections and debates on various school and classroom issues during seminars, so that by progressively reviewing this record, teachers might come to appreciate that most of their debate had revolved around the task of discerning rationales used in different school and classroom situations.

Sharing the Time Burden

A much more serious matter of concern was the amount of time available to teachers in different schools to do research. Teachers taught an average of 28 periods a week and all of them had to teach 32 periods per week, at one time or another, during the life of the project. Each teacher said that he had to prepare lessons for the 28 periods and mark assignments. Each of the teachers had a half day off-duty which was used for personal business. But invariably, teachers prepared lessons and marked assignments during their own time after school. Of the four teachers, three had school duties requiring 'office hours' besides classroom lessons. For example, two were senior masters responsible for academic affairs for the whole school, all were heads of departments, two were coaches of games and two were dormitory masters. One teacher, who later became a deputy head of school, was also head of department, dormitory master, class master, sports coach, student counsellor and taught 22 periods a week. Lloyd had a wife working at least 25 miles away from home so that he had to look after their two young children. Of the three female teachers one had five children, the second, four and the third had two children, all less than 12 years old. The third woman's husband worked some 1150 miles away from home. Teachers had pointed out that they could not find time to carry out the various research activities within their schools

It was obvious then that these teachers already had enough work both at school, in classrooms and in their own families. Given the fact that seminar discussions had to be preceded by data collection in the schools, it was clear that participation in long term intensive research was an extra burden to teachers. So quite naturally, teachers wanted to know whether the proposed pre-seminar activities were really essential to the seminar activities and whether I would be sharing the teacher's burden of 'finding time'.

It was therefore, vital to convice teachers of the importance of the different components of the research. Yet, since teachers had not been involved in the planning of the overall research, they could only come to understand and appreciate the necessity of the various components through increasingly more involvement in the research. Three barriers had to be overcome with regard to time sharing: First, teachers had to understand sufficiently those aspects of the research in which they were involved so that they could get a 'calculable' notion of the amount of time that they would need for the research. This notion was not easy to calculate until teachers had undertaken some of the activities in order to gauge their complexity and how much time the activities demanded in different school contexts. Second, teachers had to understand that since time could not be expanded, research time could only be created by carving it, chip by chip, out of existing programs. This was probably the most difficult issue to tackle, since it involved dislodging two deeply ingrained teacher beliefs namely; that there was no dead time in their existing school programmes, and that teachers were already utilizing all available time as efficiently as possible. Third, teachers had to be convinced that all participants including the researcher, were 'giving up free time' in order to work on the project.

Teachers from various schools, had different notions about how others spent their time. For instance, teachers in day schools argued that since they had to supervise student assignment preparation (prep) during the school day, they needed the weekends to cater to personal responsibilities. They pointed out that it would be easier for teachers in boarding schools to participate in the Saturday meetings. Teachers from boarding schools argued that the 'duties' in boarding schools made it almost impossible for them to attend Saturday meetings particularly, since the boarding schools taught on Saturday mornings. They argued that teachers in day schools "had no problems, no duties, and did nothing on Saturdays." We therefore, had to inspect school timetables to see where some time could be carved out of non-class time. Teachers pointed out that it would be relatively easy to keep a record of the lesson plans, lessons, tests and assignments, but that it would be difficult to keep a journal of events, activities and other happenings in classrooms and schools. Indeed, up to the end of the research none of the teachers had produced a 'written' journal. This meant that the researcher had to make more visits to schools than originally planned in order to hold discussions with teachers and 'create' a journal for each of them.

The seminar meetings retained the Saturday slot after teachers agreed that they would negotiate with their colleagues to act as substitutes for official duties except teaching. I also had to display my teaching schedule. Teachers needed to see that I had to make time for the research. But in the final analysis, teachers only began to willingly give up time after they had participated in the reseach and had probably begun to see some intellectual and social benefits out of their participation. Therefore, progressively, as the totality of all activities became self-evident to teachers, and as teachers increasingly appreciated the time-consuming activity of co-ordinating communication between us all, they ascertained that their share of work was done and in fact, often planned their availability to fit my schedules. It was never possible to settle the time issue once and for all. But as already stated, the more the teachers came to understand the nature of the project and its goals in its totality, the more they strived to make time available. At a certain level, reached in early 1984, the demand and creation of time became self-perpetuating. However, we all felt that our schedules were often chaotic, depending as they did, on 'left over' time from official and social obligations for each one of us.

Unpredictable Data Collection

During their defence, teachers had made reference to the fact that I had not given them my schedules for conducting lesson observations, interviews, and more particularly, video recording of their lessons. Teachers had observed that "had they been ready for me", I would have had a less critical reaction to their lessons and their participation than I had got. Lydia pointed out that I should have given teachers the forms for evaluating various research and seminar activities a week before, so that "they would know what I was looking for". These complaints were genuine. Even though teacher timetables were constant throughout a school term, my visits were relatively unpredictable.

The video taping of lessons was a particularly irksome issue for teachers. They expected to "see" themselves presenting a good image and model of good teaching. At the start of the project, which was characterized by an intensive classroom observation, teachers frequently asked me when I would begin video recording. After two weeks, I carried out a series of dummy video recordings before actually making any tapes so that teachers were upset to discover later, that they had not been recorded. Teachers observed that I seemed to have the knack to arrive for recording or to observe lessons for which teachers were least prepared. After debating the merits and demerits of 'prior notice', teachers compromised and agreed that for my purposes, unpredicitable data collection could not be helped. But the practice continued to be a source of concern throughout the project so that by October1984 Lloyd was still able to complain that, "I hate it when you come all the time and then all of a sudden you disappear". During the same period, I had observed Charity's lessons consecutively for three weeks, then I missed the first lesson the following week. When Charity saw me in the middle of the fifth week, she exclaimed: "my God - and just as I was thinking I had gotten rid of you from now on. I did not expect to see you until next year".

Advise on Instructional Change

A more important but subtle problem than the three discussed so far- subtle because teachers did not discuss it directly- concerned the credibility of the four participating teachers for purposes of advising each other on instructional improvement. Evidence of the existence of this problem accumulated as the seminars progressed through two and half years of discussion. At the beginning, there were three issues related to the problem. First, Lloyd and Lydia worked in schools of high academic achievement, while Dalia and Charity worked in low achieving schools. Was there any useful instructional information (or any other information for that matter) which Lloyd and Lydia could learn from Dalia and Charity? Second, since students at Provincial and National, where Lloyd and Lydia taught respectively, were already performing very well in biology and other subjects, were there sound reasons, and was it sensible to expect advise about "more effective" instructional strategies to come from teachers in schools with "known" poor levels of student achievement? Third, was it reasonable to expect Charity and Dalia who taught in schools where the initial intellectual calibre of students was presumed to be low, when compared to that of students at National and Provincial, to teach as effectively as Lloyd and Lydia? Later in the research, a fourth issue arose. On one hand, Lydia and Lloyd insisted that the high levels of achievement in their two schools were supported primarily by teacher commitment to their job and secondarily by the actual styles of management of the schools and intellectual abilities of the students. They therefore, regarded poor achievement at Charity's school as due to improper prioritization of teacher and student activities throughout the school day. On the other hand, Charity regarded poor student achievement in her school as primarily the result of a combination of poor school management and low student initial abilities. Dalia regarded her school's low achievement as due to the school's poor financial and material resources. Given this range of perceptions concerning the influence of various factors on achievement, was it possible for teachers working in very different social, intellectual and financial environments, to give credible instructional advise to each other?

Since teachers from the 'good' schools regarded school management and student abilities as not really crucial, they in effect, covertly rejected advice from teachers in schools where these factors were problematic. The team had therefore, to agree on who should decide on issues of importance for discussion and whether or not teachers should strive to reach consensus on every issue. There were implicit indicators of conflict on these two questions. For instance, teachers were prepared to discuss video tape episodes by reference to what pupils did and not to what teachers did during lessons. Similarly, teachers preferred to discuss school management by reference to what school heads did and not from how the research teachers personally responded to the head's actions and behaviour. Similarly, student achievements would be more amicably tackled if discussion were based on student initial intellectual abilities and not on the contribution of individual teachers to the continued development of these abilities.

To work toward a compromise, a number of factors had to be considered. First, the project goals, as defined by myself, although sufficiently open, imposed a certain restraint on the kinds of topics that could be discussed. Yet teachers working in schools with different levels of academic excellency, were unlikely to select similar issues of importance. To resolve this issue, individual teachers were asked to choose topics of interest for discussion. But it was agreed that different teachers would lead different aspects on the same issue. For instance, Charity selected 'communication in school' as a topic of interest. The discussion began with Charity giving a perspective from her school. The other teachers then presented perspectives from their own schools, while I drew out comparisons and pointed to discrepancies between prescribed practices from the school's written rules, the teacher perspectives and my own observations.

Second, there was the issue of honesty. Teachers did not deliberately try to distort information about their schools, but two prevalent trends in reporting information were noted early in the research process. On one hand, Lydia and Lloyd, were fiercely royal and supportive of their school management structures and policies, particularly, in matters of regimentation, discipline and adherence to tradition. As a result, while defending these policies to the last word, teachers would unconsciously ignore events, settings and processes that might, in fact, be contradictory to the prescribed goals of the school. On the other hand, Charity and Dalia, tended to see very little in their school management structures, policies and traditions that they considered useful or proper, and as a result, they would denigrate such policies at length. My task in these discussions was therefore, to be sufficiently alert to spot these areas where we needed to counterbalance these two extreme points of view without, in the process, leaving their proponents with the notion that their knowledge was being challenged.

We therefore, abandoned attempts to work towards consensus on each and every issue of discussion. This was neither easy nor always achieved by teachers especially on matters of discipline. Teachers often apportioned blame to each other and some teachers frequently felt that the ideals and actions practiced in some high achieving schools "could never" work elsewhere. For instance, the more clearly Lydia and Lloyd reconstructed for Charity and Dalia how well and why things worked so well in high achieving schools, the more the former cemented their beliefs that these practices would not work in the low achieving schools.

As to the nature of advice on specific instructional techniques, it was evident that Lydia and Lloyd, initially envisaged little, if anything, about how research might assist them to improve teaching. After all, their students were already passing very well in biology. These teachers took for granted the fact that research should strive to learn what lay behind the high and sustained achievement of their schools. A potent weapon of attack on this "feeling of superiority" was found in the very nature of scores that students from these schools had obtained in biology and other subjects in the public examination. Teachers often implied that biology was an easy subject to teach and learn. Lydia and Lloyd often stated that their pupils were bright, hard working, serious, disciplined, interested in learning, and ready to go beyond classroom lessons by reading extensively. Why then were not all students getting the maximum scores? At first, teachers had come up with reasons such as: the nature of examinations, the numbers of students, the time available to cover syllabuses and the quality and quantity of resources. By discussing the constraints to achievement brought about by some of these factors, it was possible to slowly arrive at the idea that there might be something in classroom teaching that prevented many bright students from getting distinctions in biology. Something which discussions with other teachers might help a teacher to pinpoint in his own class.

However, the question of school personalities was not resolved fully throughout the project - except at a level where the highest achieving school in the research could offer something to the high and low achieving schools. This was perhaps why, right up to the end of the research, the teacher from the highest achieving school still felt his school was a 'guinea-pig' which other school tortured by seeking information from it but with nothing to offer in return. This in itself was an interesting development implying a third image to research, and other outsiders who seek information on "how do you do it?" from schools of academic excellence. Lloyd had described Provincil's plight and torture by other schools as follows:

> "There is too much noise. There are people writing to ask for example of our mocks [examinations] our games, timetables, the dates and location of our field trips, the plays we do in drama and the types of assignments in this and that subject. Others are writing to visit us, to debate with us. Practically everyone doing some research is here. It is becoming too much and we have to curtail it."

During the two and half years of research at Provincial High, there was a lot of evidence of "noise" that Lloyd was complaining about. Ironically, it was because the school did so well that others had come to believe that if "they xeroxed" everything Provincial High did, their own schools might begin to peform just as well. All requests, in the final analysis, involved spending extra time and money writing letters, duplicating documents and sometimes rescheduling school timetables to accommodate visitors. Therefore, during the seminar teachers tried to explore how Provincial's "open door" policy contributed to sustaining its academic excellence.

Viewing of Video Tapes

There were three problems regarding identifying effective and non-effective instructional techniques from video tapes. First, teachers expected to see how their whole class and not just portions of it, responded to the teacher's total instructional strategy. Yet video tapes presented an incomplete picture of a classroom at any one point. Therefore, teachers were frustrated and disappointed during many review sessions because video tapes did not often show particular incidents which teacher claimed had been significant in determining the course of subsequent strategies. 'Missing' incidents were claimed as particularly important in situations where teachers felt that, had the incidents been captured, they would have exonerated them from their colleagues' "attacks". Second, video tape viewing is tedious unless focussed so as to look for specific episodes. Since all teachers were expected to view each teacher's tape in turn, it was difficult for teachers to pay consistent and sufficient attention during all sessions. For instance, while the owner of the tape might concentrate on viewing his lesson, other teachers might continue to talk to each other, making it impossible for them to identify objective evidence in order to contribute to subsequent discussion. Teachers adopted various strategies to attempt to harness their colleagues' attention. For instance, a teacher whose tape was under review, sensed that her colleagues' attention was waning, and therefore, began explaining and justifying what was being viewed. This of course, made it impossible to hear the tape and indeed to follow the evolving events of the lesson. Third, teachers tended to concentrate on identifing only ineffective episodes in lessons and then carry over this information to subsequently viewed lessons.

To minimize the effect of these factors, I, as a discussant, constantly tried to redirect the discussion to points which were perhaps of more interest to me than to the teachers. Since I had always been present during the recording of lessons, taken written notes, and previewed the tapes before seminars, I was in a position to steer the discussion toward my main goal, namely understanding the teacher perspectives on what had happened in lessons and why it had happened. Furthermore, I always determined strategic episodes on tapes which I wanted teachers to pay attention to, give explanations and debate various points of view. Therefore, as a procedure, teachers would view any tape they selected. But as soon their attention was observed slipping, I would direct them to the pre-selected tape episodes. While a lot of tape footage was covered in this way, and while it was possible to limit discussion to a few themes and instructional strategies at a time, these were my goals, my selected episodes, so that it was not clear whether they sufficiently served the teacher goals as well. As a strategy for eliciting data, the viewing of my pre-selected strategic episodes tended to result in a segmented picture of lessons. Yet to me this was the most feasible technique to derive information on the multiple and varied functions of apparently similar instructional techniques used by the four teachers.

Growth and Looking Ahead

Ultimately, the seminar discussions had to be linked to all other aspects of the Teaching and Learning Biology in Kenya project. While perhaps, this aspect of research provided teachers with a deeper insight into the inter-relationships between his work, that of the pupils in the research and other teachers and of pupils in the project, its effectiveness depended on some constant and exhaustive review of the research record. Fieldnotes had to be reviewed and "filled in", student ratings of lessons preliminarily analysed, notes on classroom observations summarized and emerging ideas and themes identified for validation. Evaluation of the seminar activities frequently provided an opportunity to review the totality of the research and to project future activities for both seminars and research. The projection of future activity ended up consuming major research management and planning time. Schedules for the completion of tests by students, times for video viewing by both teachers and students, pre-active lesson interviews, and other meetings were all arranged at this time. Because planning of different research activities was done as a team, teachers came to grasp the totality of the research methods, activities and purposes. Teachers were able to understand the nature of the data being collected from students and its implications so that they could decide whether or not to disclose the results to students and other teachers or restrict results to the researcher.

Consequently, when the influence of teacher seminars on the rest of the research process was assessed, it was noted that all research activities were more successful in the four schools where teachers participated in teacher development seminars than in the two schools not represented in the seminars. This was not due to unfavourable conditions in the latter schools but because the teachers attending seminars created the required time for research activities. Similarly, there was more rapport between teachers attending seminars and myself than with teachers in the other two schools, possibly because of greater interaction during seminars. Interaction between researcher and teachers and understanding by teachers of the various facets of the project ensured that research time was created at a stage where valid comparison could be made between schools on the same test.

As teachers became fully involved in seminar discussions, they also became increasingly more effective in dealing with with various research activities. Judged from the seminar discussion record, participation moved from interviews of teachers conducted by me to a state where teachers interviewed each other and demanded adequate explanations regarding claims made by individual teachers on issues such as, classroom procedures and school management. Chapters 2 and 3 describe the content of teacher discussions and reflections. A better understanding of relationships between various research activities led to better appreciation of the need for each teacher to fulfill his responsibilities to the research project. Teachers helped each other to figure out ways of collecting data in schools and how to look for information required of them in their work. Naturally, teachers had a chance to argue, accept or reject schedules for various research activities using as reasons various administrative or management components in their schools. This gave all participants further insight into the structure of rules, discipline, privileges, responsibilities and different power structures in the various schools.

Increasingly, the seminars became a vital and crucial centre of focus for finding out what was generally happening in the total research project. A consequence of this was that teachers were able to see their instructional problems and needs more clearly than before so as to come up with personalized goals for participation in research. Similarly, teachers identified specific instructional techniques and broader research problems and goals they wished to pursue in the second year of the research. The nature of teacher implemented instructional techniques and research projects and findings are discussed in chapters 4 and 5 respectively.

The Seminar Record

In two and a half years of research 20 one-day teacher seminars were held. The following chart shows the dates of the seminars, the number of participants, and the major topics of discussion. There were five constant participants, namely, the four teachers and myself. However, teachers sometimes invited a visitor, normally a teacher who wished to either conduct observations or participate in the seminar. The penultimate seminar was attended by all teachers who had participated in the project from all six schools. For the last seminar, each of the participating teachers invited colleagues so that this seminar had 32 participants. With regard to schedules, there was an attempt to hold three seminars per school term. However, seminar dates were always selected to fit all other responsibilites of teachers at school and to their families. We did not hold seminars during school holidays and seminars were often held on consecutive Saturdays whenever there was need to extend discusssion on a topic of interest.

Chart 1: Dates and Topics of Teacher Seminars

	Date	Number of Participants	Major Topic of Discussion
1.	27/11/1982	9	Overall nature of the research project and teacher contribution
2.	12/03/1983	6	Description of characteristics of 4 schools; responsibilities of teachers and researcher; streaming of pupils in schools
3.	14/05/1983	5	Punishments in schools; classroom questions
4.	04/06/1983	6	Organization and management of schools; interpreting the biology syllabus
5.	18/06/1983	5	Communication structures in schools; discipline and control; interpreting the biology syllabus
6.	16/07/1983	7	The allocation of school duties; purposes and conflicts; classroom questioning
7.	17/09/1983	5	Time allocation and school work; sequencing topic in teaching biology and streaming
8.	04/10/1983	5	Nature and purposes of transfer of teachers; assessing learning; how to set mock examinations
9.	11/10/1983	6	The teacher as a family person; giving classroom notes; fieldtrip work in biology

Continued

	Date	Number of Participants	Major Topic of Discussion
10.	22/10/1983	6	The proposed 8.4.4. education system; the benefits of marking public examinations to classroom teaching; classroom questions
11.	10/03/1984	7	The selection of pupils for Form I; challenges to biology teachers teaching in mixed ability classrooms
12.	22/03/1984	5	Parent attitudes towards their children's education; day and boarding schools; keeping records of biology work
13.	26/05/1984	5	Teacher participation in curriculum development; the ssefulness to teaching of circulars from MOE and the Examination Council.
14.	07/07/1984	7	School facilities and resources for learning; the role of the head of school; student learning and memory
15.	24/07/1984	5	Remedial work for slow learners
16.	21/09/1984	5	Teachers training; post-graduate work for secondary school teachers
17.	06/10/1984	7	The new 8.4.4 education system; education and work; what do pupils do when the teacher is absent?

Continued

	Date	Number of Participants	Major Topic of Discussion
18.	20/10/1984	5	Interpreting the results of mock examinations; from teacher to head of school - experiences of project participant.
19.	11/05/1985	9	(See Chart 2 below)
20.	18/05/1985	32	(See Chart 3 below)

Chart 2: Topics of Discussion During Seminar on 11/05/1985

a) The evolution of the research project- where we are

b) Discussion on the seven preliminary reports of research results

c) Possible dissemination channels for research results

d) Implications of research results for teacher pre-service models

e) Identification of topics and timetable for biology teacher seminars of 18/05/1985

Chart 3: Topics of Discussion During Seminar on 18/05/1985

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a) Introduction to the project teaching and learning biology in Kenya

b) Presentations by project teachers:

1. Should public examinations in biology match the content of classroom teaching evidence from research

2. Where should the emphasis be in training biology teachers: experience from teaching and research

3. The contribution of parents and community to poor student learning in secondary school - a case study of learning biology

4. A model for formative assessment of student practical work

5. The real problems in teaching biology- a view from a day school

6. Using extra-curricular programs as instruments for social development among students

7. Developing long term professional development and communication between teachers and researchers

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The pattern and sequence of activities described earlier, were followed for all seminars except seminars 19 and 20 held on 11/05/1985 and 18/05/1985 respectively. This means that the major topics given in the chart are those discussed under the sharing session. As is evident from the chart, more than one topic was often discussed in the sharing session. This was due to the fact that after viewing a video tape, teachers often held another sharing session that went beyond the prepared topic. Space in this report does not allow the description of the content of all sharing sessions as listed above. Only three strategies namely, questioning, interpreting the syllabus and sequencing biology content are discussed.

Chapter 2

SEQUENCING CLASSROOM CONTENT

> "Curriculum development in which classroom teachers are not involved, where the developers merely add or subtract a topic or change the phrasing of the goals, is a lot of hot air breathed out too fast and therefore, cools just as quickly". Lloyd - 1984

Introduction

During this research (October 1982-October 1985) each of the four schools was supposed to be using three different syllabuses, namely; School Science Project Biology (SSP), the Intergrated Biology Syllabus (1980) and the Two Cycle Syllabus (1981) for teaching biology at various levels of school. Only the Two Cycle Syllabus was said to be in use in all research classrooms in Form 1 to Form 3. However, because project teachers taught biology at all levels of schooling, all teachers said they were planning lessons using 4 different syllabi (the 4th syllabus being that of A level). In nearly all seminars, teachers addressed aspects of issues on sequencing biology content for various levels of students. Indeed, as teachers participated in seminars with increasing openness and confidence, they became more aware of the intricate relationship between interpreting the syllabus, planning lessons, actual classroom teaching, and assessing learning. The seminar record indicates that issues on sequencing content were discussed under six main questions, namely:

1. **What exactly is the contribution of a syllabus to classroom teaching?**
2. **Where and how do teachers derive information for sequencing topics for classroom teaching?**
3. **How useful is the sequencing of topics given in the syllabus for actual lesson delivery?**

4. What is the usefulness of goals and objectives spelt out in the syllabus for classroom teaching?

5. How do teachers decide on the depth and breadth of treating particular topics since these dimensions are only vaguely treated in all syllabi?

6. What is the relationship between syllabus interpretation and teacher curriculum development?

The following description of the highlights of discussions on sequencing content does not fall into a pattern that would answer the six questions consecutively. This is intentional. First, there has been an attempt to preserve some notion of the origin of discussion on the issue. Teachers did not actually plan to have curriculum interpretion and sequencing of content as major topics of discussion during the sharing session in any one seminar. The subject always came about as a side issue during both the sharing session and viewing of taped lessons. Teacher efforts to tackle the issue were summed up by Dalia during a post-interactive interview when she said,"we are always talking around and about the topic but it is never the centre of our discussion..." A great deal of seminar time was spent discussing the issue, which attested to its importance among teacher concerns. Teachers frequently returned to the issue as a point of reference both during each seminar and across several seminars, in order to explain the rationale for instructional decisions. The fact that no teacher ever suggested devoting a full seminar session to the issue, was probably important evidence of teacher concept of a syllabus as an immutable document. The syllabus prescriptions of goals, objectives, topics and sequence seemed to be defined by teachers as ready-made directives, where no major opinions, changes or questions were expected. And yet, as subsequent discussion showed, teachers had many questions and various perceptions of the syllabus and had implemented numerous changes in official syllabi in order to match these perceptions.

It was evident that while different teacher perceptions influenced action, the key determinant of practice in using syllabi was the school's or department's policy on curriculum interpretation and sequencing of content. In schools which had clear instructional goals, school-wide management structures and policies on interpreting the syllabus dictated and supported departmental practice and minimized individual teacher requirements to search for workable strategies. In situations where school-wide goals and policy for interpreting syllabus and sequencing content were fuzzy, there was a tendency for individual teachers to evolve and install unaccountable practices of the 'what works for me' type. The rest of this chapter documents these various practices.

Where are Schemes of Work Used?

Questions concerning the interpretation of the biology syllabus and its utility in daily classroom work can be viewed from three stages related to teacher professional growth. First, pre-service teacher training courses on teaching methodology have been known to spend a disproportionately long time discussing and, in some cases, practicing the designing of schemes of work, planning lessons, and writing behavioural objectives. Second, teacher trainees during practice are expected to write schemes of work and lesson plans so that supervising tutors can assess classroom teaching with reference to these document adequacies as predictors of good practice. In judging the quality of classroom teaching, tutors often complain about trainees either treating a topic "superficially" or "digressing" into a deeper explanation of concepts than that needed at a particular level of teaching. Third, it is somewhat rare to find classroom teachers referring to schemes of work as guidelines for daily teaching.

During negotiation for entry into the research schools, some teachers were heard to casually comment that they did not "follow" the syllabus. During the initial interviews in January 1983, teachers were asked to show a copy of the biology syllabus and the scheme of work that they were using in the research class. At Urbana High, Charity said that she was using the two-cycle syllabus, which she said she had somewhere. It eventally took her three weeks to find a copy. Regarding the scheme of work, Charity had explained, "there is something for the whole school which is kept by one of the teachers". At District High, Dalia said that she was using the two-cycle syllabus, but she could not remember where exactly she had filed the copy. She directed me to consult her head of department whoq she said had a copy of the syllabus and the schemes of work. At National High, Lydia said that she had a copy of both documents on file, but asked when she had last used them, she said, "I looked through the syllabus when they [MOE] first sent it two years ago, but I did not understand its cycles and I decided not to use it." At Provincial High, when Lloyd was asked for a copy of the syllabus, he climbed on a stool, rsearched on top of the storage drawers in the laboratory cum preparation room and brought down a dust covered file. He rifled through it and stated while laughing, "this is the Ministry syllabus". Sitting down, he reached across his desk and pulled out another file, pushed it across to me and announced, "this is our syllabus and scheme of work".

During numerous pre-active interviews and observations on planning lessons, teachers consulted textbooks, old teaching books and notes, past public examination papers, their colleagues and even myself but not syllabii or the schemes of work. Where then did teachers obtain guidance for planning and teaching biology at different levels of depth of topic and class?

Classes and Streams

During the second seminar held on 12/3/83, a description of the characteristics of each of the four schools was given by each teacher. This led to a discussion of responsibilities of teachers, particularly, the work of class teachers in class streams at one form level. We learned that at Urbana, National and Provincial, streaming of students in forms 1 and 2 was done according to the student's last name. The idea was to have all possible letters of the alphabet represented in each of the class streams. At District, a provincial school, streaming at Form 1 was based on the presence of both a government maintained and a *Harambee* (community self-help) section in one school. Consequently, the majority of students in streams 1 and 2 belonged to the government maintained section while students in stream 3 belonged to the *Harambee* section. With

6, 3, and 4 streams of Form 1 class at Urbana, National, District and Provincial respectively, how were the sequencing of content and teaching achieved to enable all students to sit for the same examination?

At Urbana, Charity pointed out, that sequencing content and teaching were a real problem since it was normal to find teachers teaching at all levels. The rationale for 'vertical' allocation of teachers to classes was that :

> "It would be too boring, too repetitious for one teacher to teach all streams at one form level. It might, in fact, be very difficult to teach the same content to all streams since a teacher is bound to get confused as to whether or not he had covered a particular piece of information in Form 1A or Form 1E".

Lydia explained that at National, "It has always been the practice for a teacher to teach at all streams at one form level in biology". Lydia disagreed with Charity that 'horizontal' allocation bred boredoom:

> "I find the classes so different that it is hard to think of them as the same. In one, the students may be quite different, they behave differently. Recently we have tried to change to what you have (at Urbana), we had discussed the idea when we had a different head of department, but when he was transferred, we forgot the idea. It has not been revived".

At District, Dalia said that there was no definite rule or tradition. A teacher may teach all streams at one form level, teach across form levels or have a mixture of both. What was important was the total number of hours a teacher taught. Giving her own workload as an example, Dalia stated that she was currently teaching 15 hours of English language, which meant that she could only teach 7 hours of biology at Form 1 (3 periods) and Form 3 (4 periods). Lloyd pointed out that at Provincial, assuming there were enough teachers, which teacher taught at what level and how many streams at a single form level, depended on tradition and the decision of the head of department. The usual practice was to have every teacher teach at each form level in forms 1 to 4. At forms 5 and 6, all biology teachers taught only a certain number of topics. Lloyd explained that, "a teacher must learn to teach at each level and collect sufficient notes and material so that if he is transferred to a school where he is alone, he cannot say - I have never taught form so and so". With regard to the practice of all biology teachers teaching particular topics at forms 5 and 6, Lloyd added, "many teachers have a preference, either of plants or animals, or ecology. Since the syllabus for forms 5 and 6 is very broad, this enables each teacher to select, plan and teach what interests him most". Lloyd was of the view that although this practice often led to a situation where the head of department was left to teach all the "topics that nobody wants", it at least, ensured that teachers taught what they liked and probably knew best. Lloyd also emphasized the fact that this paractice enabled students to have a variety of teachers for the same subject which he thought assisted students to develop their own interests for later specialization.

It was clear that the rationales for allocating teaching tasks to teachers were based on differently perceived utilities for the practices. At Urbana, repetition of the same content was regarded as tiresome to teachers and likely to mitigate against coverage of the same content for all students. There appeared to be no recognition of the fact that whether or not 'horizontal' allocation was implemented, differences in delivered content would still exist. At National, teacher repetition of the same content did not appear to be an important factor since a departmental tradition, including high student achievement in biology, had made teachers believe that 'horizontal' allocation was a successful strategy. Lydia's comment that an idea to implement 'vertical' allocation was abandoned after the head of department was transferred was interesting since it was Lydia who had succeeded the head of department. Had Lydia believed that the idea was worth pursuing, she probably would have introduced it. But Lydia stuck to the departmental tradition adding her own philosophy that students in each stream, even at the same class level, were sufficiently different so as to dictate different dynamics of content delivery in each class.

At District, little thought had been given to considering the consequences of streaming students with regard to teacher ability to deliver content. As a school with few elements of a tradition of successful practice, practicalities took precedence in deciding upon policy and action. In this case, the school utilized the fact that all teachers could teach two different subjects and thus allocation of teaching duties need not reflect concern for the intellectual pursuits of teachers and students, as long as the expected workloadsof teachers were

At Provincial, departmental policy recognized that in-subject specialization, interests and preferences would influence teacher efficiency and effectiveness as resources for content. At implemention, the policy enabled teachers to pick and teach topics of interest, develop cumulative capabilities as teachers of biology at different levels of schooling, and act as specialized models for the emerging interests among students. At the same time, the policy enabled the department, and indeed the school, to carry out its traditional role as a site for training future heads of subject departments and senior members of staff for other schools.

The Syllabus

A substantial amount of time was devoted to a discussion of the syllabus during the seminar held on 04/06/1983. The most eloquent discussant on the subject was Lloyd who clearly had more experience than any of the other teachers in the area of curriculum development. Lloyd had taken a teaching course in biology abroad and during his practicum, he had noted that the classroom teacher there had greater responsibility for re-structuring the "official curriculum" in his class. Lloyd had also participated in curriculum development at the Kenya Institute of Education as a member of the Biology Subject Panel and as an author of resource materials and teacherguides for general science for adult education courses. Furthermore, as head of the biology department at Provincial, he was responsible for re-organizing the biology syllabus to suit the needs of school teachers and students.

Lloyd reported that he was generally ambivalent about the mechanisms and processes of curriculum development in Kenya because he believed that it was not possible to teach effectively from the official biology syllabus prescribed by the Kenya Institute of Education. As the second most senior biology teacher in a department of six teachers for eight years, he and three colleagues had recently "revised" the official biology syllabus. Lloyd did not know the origin of the tradition in the department of "ignoring" the official syllabus, but from records of dates on previous syllubi on file, Lloyd had determined that the practice was at least some 12 years old. Why did the biology department design its own syllabus? Lloyd had explained that, "the official syllabus is not a teaching syllabus. Someone, probably from the university, has compiled a lot of topics under one cover. He is not very sure what is teachable and what is not teachable. At any rate there it is. A syllabii. (with laughter)." Lloyd and his colleagues had therefore evolved a "teaching syllabus", presumably, one that consisted of only what was teachable. But Lloyd was quick to add that, "none of the topics in the official syllabus are really unteachable. But they are not easily learned in the format and order in which they are presented in the syllabus". Furthermore, it appeared that Provincial had not had less than two biology teachers over the past 15 years, because Lloyd had emphasized that, "interest is the key issue. We have devised some topics according to interest. Some teachers prefer animals, I prefer plants". But did Lloyd's syllabus really differ from the official MOE syllabus?

Teachers had a chance to inspect copies of Lloyd's syllabus during the seminar held on 4/6/1983 and compare it with the four official syllabi for 'O' and 'A' level biology. Teachers had, earlier in the sharing session, discussed management and administrative structures of schools where the role of heads of departments had been described as, "to ensure that the subject syllabus is properly taught and covered at all levels of schooling" At this stage in the research, Lydia, Charity and Lloyd were heads of biology departments.

Teachers inspected the various official syllabi and compared them to Lloyd's syllabus. Charity's first comment on Lloyd's syllabus was that it was only a scheme of work. Dalia agreed with Charity; but Lloyd insisted that it was a teaching syllabus and not a scheme of work. Lydia, after carefully examining the syllabus commented more to herself than to Lloyd, "this is your syllabus. Oh! And you teach all this?"

Part of the reason for the three teachers' comments was due simply to the size of Lloyd's syllabus. Unlike official syllabi for 'O' level, the largest of which was eight pages, Lloyd's syllabus was 35 pages long. Dalia's subsequent comment in this regard was especially revealing as to what teachers expect of a document defined as a syllabus: " if you want to give all that much information to teachers as to what to teach, do not call this a syllabus. Simply say: Teachers' Guide or Schemes of Work. No one will believe you if you call this a syllabus." As inspection of Lloyd's syllubus progressed, Charity commented, " first, I see no topic in the official syllabus which you have left out and there is no new topic in your syllabus which is not in the official syllabus".

Lloyd explained that there were three major differences between his syllabus and the official syllabui, namely:

1. Instead of arranging the topics according to either logical biological sequence or evolutionary basis (the two approaches attempted in the official syllabuses) Lloyd's syllabus was arranged according to the complexity of topics to be taught and learned within and across various forms, basing such sequence from teachers' previous experience in dealing with the various topics.

2. The syllabus did not merely suggest for example,"that experiments on photosynthesis should be undertaken", but it spelt out the actual required experiments for each topic.

3. The actual specimen and materials to be used in the various experiments were listed per topic and sub-topic.

Were there critical advantages to these arrangements that served biology teaching in Lloyd's school better than in other schools where a similar syllabus did not exist? Lloyd argued that the designers of official curriculums and syllabi base the sequences of topics on learning theories that rarely represent classroom reality as the teacher understands it and is confronted with on a daily basis. Lloyd described such official syllabi as, "descriptive documents of what to teach and not prescriptive models for practical instruction on the topics therein". Lloyd explained that the organization, traditions, the exercise of authority within individual departments as well as the overall rapport among staff in his school were all important factors in determining actual sequencing strategies of biology content. Moreover, since a wealth of accumulated information about previous practices and their rationale was often on record, the head of department could consult such resources when revising or planning new or different strategies.

For example, the structuring of the scheme of work for each term took into account the seasonal availability, within the school's reach, of plant and animal materials such as crotalaria, algae, fish and frogs. While the school had both an animal house and a fish pond, there were seasonal variations in the abundance and quality of specimens from these two sources, which sometimes necessitated "hunting" for specimen further afield. Consequently, the topics revised and agreed on by teachers at the beginning of each term, were designed to make maximum use of available biological materials. Similarly, student participation in long term projects in biology, such as those for ecology, were sequenced in conjunction with other long term projects in other subjects such as geography and agriculture as well as with reference to other major school activities such as drama, field trips, and athletics so as to conserve intellectual energy, time and money. Lloyd believed that division of labour among staff and individual accountability were basic management strategies in his school which were all reflected in the sequencing of topics in the syllabi for several subjects.

With regard to ensuring that all students in different streams actually covered the same content, Lloyd explained that since biology was a compulsory subject for all students at 'O' level, all four streams per class had to cover exactly the same content each term and this was the purpose of the detailed syllabus that the department had designed. Every teacher had to use the syllabus in order to get a clear notion of what topics had to be covered each term, which experiments had to be done, what specimens were available and how many tests would be given to students.

In addition to placing emphasis on the disparities between his syllabus and the official syllabus on all the above points, Lloyd also strived to get teachers to see the incongruity between the way the topics in the official syllabus were arranged and the nature of the learning process and capabilities available to students at different levels of schooling. Lloyd stated: "these fellows' [students] brains do not work that way. (laughter from teachers). The way the student grasps content, its structure and complexity is very different from the way the topics and contents are structured in the official syllabus. But such learning processes are well considered in this [his] syllabus. This syllabus is based on Piaget's ideas."

Teachers then begun a discussion of Piaget's theoretical framework and its relationship to sequencing curriculums. All emphatically agreed that classroom teaching had to begin where "the child is." In order to help teachers to appreciate the meaning of Piaget's ideas, I guided the teachers through a brief examination of the psychological concepts that were stated to support all four school biology syllabi that teachers were using in teaching. I emphasized the following three points:

1. All syllabi were undergirded by the following four major psychological concepts. A learner learns best by doing. A learner should see and be able to communicate what he has seen and learned. The conceptual demands of content should be matched to the learner's intellectual abilities. And, the content should be applicable, and where possible, applied to the learner's daily life.

2. The four concepts, each of which theoretically imposed on the instructional technique certain specific obligations and responsibilities, should, in turn, require the learner to demonstrate specific behaviours concordant with each of the concepts as derived from the four different psychological stances.

3. **Since all four concepts were incorporated in the same syllabus, there were inherent contradictions with regard to instructional techniques and demonstration of achieved learner behaviours.**

Teachers explored the meanings of propositions such as: "learning by doing" ; "the child should be shown what he is learning and be able to communicate about it in socially useful ways"; "using what is learned in daily life."; and, " matching content's conceptual demand to learner's intellectual ability", as derived from concepts in psychology. Although teachers agreed with Lloyd that it was "good to keep in mind" the various propositions during lesson planning, they said that it was not possible, in an examination oriented system of education, with strictly prescribed syllabi to have relative ends to schooling for individual students. Teachers finally agreed with Dalia that curriculum designers, being unaware of classroom realities, were too idealistic in prescribing both the goals and the content.

But Lloyd's argument was that the difficulties in integrating psychology during the teaching of biology and in being able to apply different learning theories were not unique to the classroom teacher and were in fact, a more serious problem to curriculum developers than to teachers. Lloyd believed that ultimately, curriculum developers and teachers had to ask themselves the following two questions. Was it reasonable to expect a classroom teacher to evolve an instructional strategy that encompasses all differing psychological concepts? And, what would be the character and temperament of a student who was the product of this 'encompassing instructional strategy'?

Teacher discussion of these two questions appeared to support two beliefs. First, that the classroom teacher, at the crucial point of deciding what to teach and how to teach it, "must interpret the curriculum and devise instructional strategies that bear an image of both the structure of content and the processes of human learning which each teacher identifies in a very personal manner". Second, that teachers as practitioners, already knew how "these fellows' brains work", at least, in so far as sequencing concepts within major biological topics was concerned. But these beliefs left two other questions unanswered. Was every teacher's knowledge about the theory and practice of sequencing concepts already encompassed within a known psychological stance? Could the meanings and implications of sequencing biology content according to the knowledge of individual teachers violate or at least, conflict with basic goals of teachng biology as a disipline?

On these two questions, Lloyd contended that the most important factor in teaching biology was to have students do as much of the practical work as possible. He added, "of course, there are ultimate goals such as: creativity, developing problem solving abilities and so on. But you cannot sequence and teach daily lessons using these ideas as goals or as daily objectives. They are not tangible". Similarly, Lydia believed that if a teacher paid too much attention to curriculum sequences, he was bound to get distracted by the inherent inconsistencies and contradictions in the syllabus and by public pronouncements regarding the purposes of schooling. Lydia's concern was that the classroom teacher has to get on with the task of teaching whatever syllabus is currently in fashion. Lydia pointed out that teachers had these two options. "Either the teacher sits down and tries to understand the basis of the educational practices espoused in the new syllabus and then designs context-specific practical instructional techniques that implement the new educational goals. Or, the teacher ignores the 'new changes' and uses his experience and common sense to go on teaching as best as he can." Teachers debated Lydia's conclusions intensely, in particular, that aspect regarding the "new changes". The consensus appeared to be that many "new syllabi" did not contain any new changes in content. Rather, the new changes often consisted of substituting populist goals and fancy-sounding objectives for the same goals, activities and objectives, which were found in previous syllabi.

Lloyd added a dimension to the definition of "these old new changes" by asserting that the changes were often very difficult to implement because they assumed that students already had a basic core of information, which was not the case. Referring to *Transport* *in Animals* in the two-cycle syllabus, Lloyd explained that the topic was designed to show the concept of unity and diversity of transport systems found at different evolutionary levels of animals. Lloyd stated, "but our kids cannot get that sort of concept. To teach them so at Form1 is to waste precious time. What they need is to discuss, for instance, amoeba, its structure, digestion, transport, reproduction, sensitivity and so on. Then other animals should be discussed in the same way, up to the most complex example required. At Form 4, some students may arrive at the unitary concept sought after in the syllabus".

Teachers examined in detail the example given by Lloyd by writing the required sub-concepts on the blackboard. They proposed an outline of a curriculum unit based on "evolutionary complexity" and set out four subsuming elements crucial to understanding the unitary concept. First, students should understand that in all animals there are fundamental similarities in the basic structures, mechanisms and processes by which food, gases, waste products and other body fluids and substances are carried and distributed throughout the body. This is the concept of evolutionary unity of structure and function. Second, students should understand that evolutionary differences brought about by both genetic and envíromental factors, result in modifications and sometimes elaboration of the basic structures and mechanisms used in transport systems in different animals on the evolutionary ladder. This is the concept of evolutionary specilization. Third, in order for students to appreciate the meaning of evolutionary diversity, they should be exposed to a variety of stuctures of the transport system at each of the four levels of biological organization, namely:

Level	Prototype	Example
Cellular	Unicellular	Amoeba/paramecium
Tissue	Multicellular	Sponge
Organ	Multicellular	Part of system e.g. heart, veins
Organism	Multicellular	Classes of animals e.g. protozoa, insects, birds, mammals

Fourth, through processes of observation and discussion on transport in animals, students should increasingly have come to realize that:

1. The structure of the transport system and its mechanisms are basically the same in all animals depending characterisitically on five requirements of animals; oxygen, food, waste removal, distribution of chemicals for responses, and organism self-preservation.
2. All animals are ultimately an aqueous medium.

Teachers argued that "a student cannot reach these two concepts, certainly not at the lower levels of secondary school, because he does not possess the basic pre-requisite knowledge to build such a unitary concept." Teachers said that during teaching, the teacher should put aside the concept of logical "levels of biological organization", and teach by example, ascertaining that students observe and understand the multiple perceptual evidence of each of the eight fundamental characteristics of all organisms, namely:

Structure	Processes
Respiratory system	Respiratory
Digestive system	Nutrition
Nervous system	Response
Reproductive system	Reproduction
Excretory system	Excretion
Skeletal system	Locomotion
Life cycle	Growth
Circulatory system	Internal transport

Teachers emphasized that students should repeatedly examine the life processes of each example of animal discussed. They admitted that they had no emperical data on whether or not students consistently taught using the two different approaches would learn differently and consequently achieve differently. But Lloyd and Lydia claimed that they had been successful in obtaining high student achievement by consistent use of the structural-functional approach. Charity and Dalia said that they used both the structural-functional and the evolutionary approach depending on the topic under discussion. It should be emphasized that all teachers saw the usefulness of the evolutionary approach as an organizing principle of biological knowledge. But Lydia and Lloyd did not consider the approach a practical model for sequencing content for everyday classroom learning at secondary school. The two teachers' ideas did not violate biological principles as dictated by the nature of the discipline since biology is defined, not by the few fundamental generalizations, such as evolution by natural selection, that are currently postulated, but by the practice of the methods of inquiry that aim at verifying the validity of such fundamental generalization.

Teacher Training

During discussion concerning the syllabus, teachers had frequently referred to the usefulness of formal teacher training courses in this aspect of the teacher's work. Teachers consistently argued that during their own training, they were introduced to various theories of learning as descriptive rather than as prescriptive models for practice. When they began teaching, they had found that psychological theories did not constitute a recognizable and adaptable model for practical instruction particularly, in the areas of deciding on appropriate depth of content and sequencing various topics. This discussion was of course, interwoven with a consideration of the quality of the minimum psychological knowledge that ought to form the basis for the classroom organizational skills of a teacher, which according to the teachers, had not been clearly defined and had therefore been assumed to vary immensely from teacher to teacher.

Teachers contended that few teachers were as aware or as informed as they might be, to make maximum use of ideas on learning theories in practical classroom situations. Teachers argued that teacher training courses gave trainees only a core of insights on how to sequence and interpret the syllabus, but that a teacher's real learning took place during teaching and interacting with the content on a daily basis.

Lloyd argued that it was impossible during college lectures, to simultaneously combine the theory on curriculum sequencing with the practical dynamism of the real class, unless the teacher trainee has had teaching experience before formal training. He stated:

> "Syllabus sequencing that is not based on concurrent practical acquisition of the basic and real learning of the psychology and the characteristics of form 1s, 2s, or 3s, is a wasteful exercise."

Perhaps even more significant than teacher beliefs that formal college teacher training programs and courses had neither the experience, nor the scope and time necessary for training in "how to teach", was the revelation that in only a few schools, did a newly qualified teacher find support and assistance from senior teachers on issues of curriculum development. Teachers provided a great deal of autobiographical evidence concerning the lack of support and assistance they had to endure when they were "new teachers". But there was divergence of opinion as to why experienced teachers did not co-operate and offer help to newly qualified teachers on matters regarding curriculum interpretation and general instructional practice.

Lloyd believed that both newly qualified and senior teachers were lazy, asserting, "they do not want to be told how to work and are prone to getting upset when told to do the right thing". He thought that newly qualified teachers were often arrogant, especially the university graduates, who tended to look down on experienced teachers with lower qualifications, adding, "they believe they know everything. So the experienced teachers will have nothing to say." Dalia and Lydia, however, believed that much of the criticism levelled against new teachers was based on unfair ratings and prejudices. Lydia pointed out that there was too much generalization about the quality of teachers. Charity pointed out that even when a new teacher was not rude or arrogant, there were few schools where senior teachers genuinely tried to assist him. She stated:

> "In my experience, when you are a new teacher in some schools, they overload you with work and they don't let you

forget for a moment, that you are an inexperienced teacher."

Three factors frequently stated as contributing to the difficulties a new teacher found in interpreting and sequencing biology curriculums, were summarized by Lydia as follows:

1. "A new teacher has just had three years of advanced university biology from a professor who does not like education and therefore, makes no effort to show how biology can be taught in school. Those professors who try to deal with methodology often use illustrative examples which are not taught in schools.

2. There is too much specialization and fragmentation of content in university courses in such units as physiology, parasitology, mammology and plant physiology. This is a barrier when a teacher first starts teaching at school because he has to learn to integrate topics from diverse specializations, which is something that the teacher has not been taught at univesity.

3. There is the temptation to teach biology concepts at the level at which the new graduate has treated them at university. The evolutionary approach is a good example. And because this sort of stuff may be too difficult for pupils, discipline problems crop up in class and outside, making the new teacher lose confidence among students and teachers alike".

Teacher discussions suggested subtle but important criteria of defining a syllabus. First, the more detailed a document purporting to be a syllabus was, the more it was likely to be considered a scheme of work and not a syllabus. Second, "how much is to be taught" seemed to be evident in the syllabus, to wit, Lydia's comment: "you teach all this? The following conclusions appeared to have been made by teachers.

1. In all schools teachers do not use the official syllabus for daily teaching. The syllabus used for this purpose is either 'publicly' constructed as in the case of Lloyd' s school or is privately carried in the teacher's mind as in the case of Lydia, Charity and Dalia.

2. 'Experience is the best teacher' in acquiring knowledge and skill on how to interpret the syllabus, sequence topics and gauge depth. Experienced teachers do not assist new teachers and pre-service training programs do not impart the relevant skills for

curriculum development.

Records as Evidence of Coverage of Syllabus

There was need to understand how teachers, through teaching experience, went about acquiring knowledge and skills for interpreting the syllabus, sequencing content and deciding on the appropriate depth of treatment of content. The most detailed discussion on the issue occurred during two seminars, held on 17/03/1984 and 20/10/1984. Only two strategies emerged which teachers said they used to get guidance on achieving the right depth in the treatment of individual topics, namely, record keeping and assessment of student learning. The ambivalence of staff, in each of the four schools, toward the strategies and the contextual problems that surrounded the use of these strategies formed the gist of discussion.

Once again, Lloyd provided the teachers with a description of "a working model" which purportedly ensured that all students in different streams of a particular form level covered more or less the same material at approximately equal depth. To achieve this, procedures had been instituted in the biology department as follows:

1. At the beginning of each term, the syllabus for a particular form was reviewed by all staff to get some balance of theory and experimental work and other practical activities.
2. For both the mid-term and end-of-term examinations, only one teacher teaching one of the streams set a common examination for all streams per level, and this examination was reviewed by other teachers before a decision was taken on its final format.
3. Each week during the term, every teacher had to enter into the departmental record file - kept in the teacher preparation room in the laboratory - the work he had covered that week, and each teacher had to mark all student practical, experimental and project work.
4. The departmental record file was constantly reviewed by all teachers so that they could see how far ahead or behind they were, in comparison to their colleagues teaching other streams

at the same class level

5. Examination papers from all streams for a particular test were always marked by only one of the teachers, on a rotational basis

and vertically along class levels. The teacher was expected to write a report about overall student performance and lead a departmental discussion on the results.

Lloyd was quick to admit that these practices worked very well and smoothly in his department mainly because, "we are all friends so that if there is need to discuss something, we treat it at that level. But beyond this, as head of department, if I see a teacher who has gone too fast or too slow, I alert him to the file". Lloyd added, however, that even if all teachers were not friends, the practices would be carried out reasonably well because of what he referred to as support by management.

Charity had listened to Lloyd's description of "a working model" with a lot of scepticism. Finally she had asked, "are there teachers who don't like to complete weekly records or who complete them too scantily to be useful?" Answers to this question focused attention to the the problems of keeping records which existed at Urbana and National.

At Urbana there were six streams per form in years 1, 2, and 3. Since every teacher preferred to teach a maximum of two streams per form level, this meant that many teachers taught a combination of subjects such as biology and geography or biology and mathematics, and thus belonged to two separate departments. Since various departments used different types of record-keeping systems, it had been difficult to get teachers to follow the models of record keeping in departments where teachers taught only a few lessons (normally three - eight periods per week) of their total work load. For example, if a teacher taught 6 periods of biology and 16 of mathematics, unless the type of record-keeping required in biology was similar to that used in mathematics, the teacher might keep no records for biology. Charity pointed out that in her department, there were four teachers in this category:

> "Because in most cases a teacher has more periods in one of the subjects than in the second, teachers develop the belief that in the departments where they teach only a few periods, they are teaching for *you*, the head of department. So they want to be treated with care, after all, they are only helping you out. So when you ask them to give you a record of work, someone may just scribble a few lines of what he has done, just the topics, as they are in the syllabus."

Charity's predicament led to comments regarding the utility of the MOE requirement that each teacher should be able to teach two subjects. Teachers recognized that the requirement was useful and that it perhaps, worked well in many schools. Yet Lloyd, Lydia and Charity with12, 8 and 5 years of teaching experience, respectively, had so far taught only biology since graduation despite the fact that they had all spent an equal amount of college time training to teach chemistry. Dalia, who was now teaching biology and English language had in fact, been trained to teach biology and geography.

Lydia explained that at National there was a tradition of keeping the "record work book" but that over time, the purpose of such a record had become subverted. Originally, it had been explicitly understood by teachers that the school head's office wanted to have a record for inspection by MOE officials and parents. However, teachers had also wanted to keep a record of what they had taught and had combined the two records. But since the record required by the head's office was normally submitted at the end of each term, many teachers, instead of filing the record weekly, slowly got into the habit of keeping a personal record, from which they would ultimately compile the record for the head, at the end of term. After a few terms, the record work book had become an individual teacher's property and not an informative file for all teachers to use in order to sequence topics and gauge pacing in various streams. Lydia revealed that the department had tried out a different system where the record work book would be completed weekly or fortnightly, but the system never really worked because many teachers often ignored completing the record. Lydia added, "while teachers were required to complete their work record in one master book, we often had no record of who had the book. Sometimes a teacher might sit on it for two weeks; then everyone wouldn't bother, because they would say, 'I couldn't find the book'".

Lydia had concluded that the record could not be a useful guide for gauging either equal depth of treatment of content or for controlling pacing of content delivery, since in her department, many teachers had 'horizontal' allocation of teaching duties.

Dalia had also explained that at District, all teachers kept a record of the work covered. Teachers were not really expected to show the record to the head of department, but were expected to use it to set common examinations for streams in the same class. Dalia had explained that there was a meeting of all teachers at the beginning of each term to decide on the common topics to be covered by all streams. Dalia added, "since there is no public record to know what each teacher has covered, in setting the same examination for all streams, different teachers are asked to contribute questions on the different topics, which I suppose is not really very good".

Lloyd pointed out that the setting of a common examination by one teacher for streams taught by different teachers was useful because it increased the ability of individual teachers to gauge the depth at which concepts have been taught. As to worries by teachers that a teacher might be unable to cover all set topics, Lloyd pointed out that in his school, it was rare to find a stream in which any one designated topic had not been taught. According to Lloyd, "what you might find by examining student papers, is that all students might have performed poorly on certain questions - indicating either that the question was too difficult, or that it was misunderstood or more often, that some concept required in the answer had not been properly taught by either all teachers or one of the teachers. But since all papers are marked by one teacher, this teacher can quickly tell the major differences between answers of students in different streams and advise teachers about omissions, misconceptions, and misunderstandings".

Charity, Dalia and Lydia pointed out that in their schools, even though the same examination with questions contributed by different teachers was taken in all streams, each teacher marked only the papers from his stream and decided on whatever remedial work was necessary. Teachers argued that there were no specific disadvantages to this system since each teacher would know the stream he taught better than other teachers, and that if a teacher did not mark examination papers belonging to his stream, it became that much more difficult for him to do relevant remedial work.

Teachers' Dread of Public Censor of Colleagues

Underlying many teacher arguments and counter arguments against public accountability of the work of teachers, was the dread by all teachers to censor other teachers, particularly on the 'quality' of teaching. It was precisely this dread to censor teachers that made it impossible to institute and maintain public records of work at National, Disctrict and Urbana thus failing to get teachers to see the work record as as both an intellectual and administrative tool. Moreover, schools often kept a record of work simply to avoid tight situations as descibed by Dalia, "it is very embarassing to go and ask students for their notebooks after a teacher has left. The head of department ought to know where and at which topic each teacher has stopped".

Teachers suggested that different reasons had to be argued and understood in each school context, if teachers were going to contribute to keeping a systematic public work record. The implementation of these public record-keeping systems demanded either mutual responsibility or authority. For instance, in Charity's school the head of department could, "tell a teacher who has been rushing, to stop teaching until others catch up with him". And yet there was no help to this "rushing" teacher on what to do with students while they sat idly waiting for other streams to catch up with them. Dalia thought that the practice in Charity's school was unacceptable; and Lydia had asked in exasperation,

> "But with what authority do you tell me to stop teaching? It is very difficult to tell a teacher to slow down or hurry up. Her own classroom practices may not allow this. I would never ask a teacher to stop teaching to wait for others to catch up. I might

> encourage the teacher to revise or to increase practical work. But you are not going to tell the teacher: 'go into this or that detail'. He will ask you, which detail? And how do you know I haven't gone into such detail already?"

Lloyd pointed out that the "stage of physically" asking teachers to slow down or to catch up with other others should not arise in a situation where teachers have for instance, clearly understood the topics to be covered each term, realized that the end-of-term examination would be set on "topics set to be done during a term" and not "on topics actually done in each stream", and kept a weekly record of their work. Lloyd argued that a combination of these three practices often ensured that teachers remained in touch with each other and synchronized teaching. While admitting to the rigidity inherent in the practices, Lloyd pointed out:

> "We have to insist on some level or rules otherwise some problems will arise in some classes. It is important for the teacher to know that if he is too slow he will have to rush at some point and even set up make-up classes. If he is too fast, other teachers are not going to rush to catch up with him and it will be his problem to convince students so that they don't think that he is not teaching them, when he begins to do revision in the middle of the term."

But Lydia insisted that every teacher was an authority in his class and that while other teachers could give advice, no one, including a school head, had authority to tell a teacher to stop teaching, even if the syllabus had been covered. Lydia's statement underscored each teacher's, including teacher trainees, immunity to censor by colleagues, by reference to "how helpless" she had felt when a teacher trainee had "really upset her class."

Lydia and Dalia's research classes had been allocated to teacher trainees for six weeks. In Lydia's case, the teacher trainee had wanted to be assured constantly by experienced teachers in the school that he was teaching concepts at the right depth. Lydia had initially explained to her colleagues that the trainee "has a problem - he keeps referring to you - to find out whether he has done the right thing." After three weeks, Lydia had sought advice from the seminar because she was becoming worried, since she was not sure if the trainee was actually teaching at all. Asked why she did not sit in the class as an observer, instead of having to speculate on whether the trainee had really taught, Lydia replied, "that will undermine him even more. What I have now decided is to have him write everything that he has taught after each class so that I can, later in the year, go over it with students".

In Dalia's case, the problem was different but equally illustrative of the dread of colleagual censor. After the trainee had been teaching for two weeks, it had been "secretely" reported to Dalia that the teacher trainee was not teaching well. He was said to be confused and teaching by reading from a textbook. When Dalia was asked what she intended to do about the problem, she replied that she was not going to do anything to "embarass the poor guy" while he was still in the school. Dalia added, "even his college tutors know his work. He is teaching by reading. You should see the textbook, it is very well used! I will have to re-teach everything when he goes."

Lloyd's research class was, at one point, briefly allocated to a teacher trainee who, in an effort to identify himself with students, pointed out to them that what they were learning was not that important or useful in later life. Asked what he had done in the situation, Lloyd stated, "I told him his role was to identify with teachers and not with learners, otherwise he would soon have discipline problems."

Teachers described other examples of schools where the maintenance of public accountability records of work had been abandoned "because some teachers might use them to undermine others". Thus in some schools, teachers were "allowed" to mark only examination papers from classes they had taught because "if another teacher marks them, they might start undermining you". Similarly, teachers did not like the practice of different teachers teaching different topics to the same class in the same subject. Lloyd had admitted that he was always embarrassed whenever he received complaints from students that a particular teacher was giving them sub-standard content as compared to other teachers. Lloyd stated that in a situation of this nature it was important not to undermine another teacher, adding, "I always tell these students that teachers are different and that they cannot expect the same thing from all them. And since everything taught is written in some book, I encourage them to read. I also tell them that at university, some professors will read to them notes they made 25 years ago and there is nothing you can do." It did not seem to occur to Lloyd that the last part of his remark could undermine teachers at another level.

Dalia, Charity and Lydia pointed out that it was precisely to avoid the "inevitable comparisons of teachers by students" that they allocated forms rather than topics to individual teachers. When I pointed out to the teachers a subtle contradiction between Dalia's comments about the teacher trainee's "using the textbook" and Lloyd's encouragement of his students to read, all said they could not see any contradiction. Except for Charity, the teachers were very secretive about the source of their notes and the kinds of textbooks that formed their references. As Lloyd had pointed out during a pre-active interview, "if they [students] know where you get the notes, they won't listen any more". The trainee who "used the textbook very well" had been chided because his instructional strategy consisted of reading and using a textbook in front of students, which teachers believed, had suggested to learners that "the teacher did not know what he was teaching".

When I suggested that since teachers generally, hid their reference resources in order to maintain authority over knowledge and to appear to be its primary source, Lloyd's advise to students to read instead of taking the teacher seriously, had undermined this authority, teachers resolved the apparent contradiction easily. Lloyd had stated: "Form 1 to Form 4 students need to have a deep appreciation of the teacher's authority on both content and discipline. At higher levels in forms 5 and 6, even though the same appreciation of a teacher's authority on content would be useful, the students are at a level where they know that a classroom teacher cannot be the final authority on content, and there is no point in a teacher hanging on to this no-existent authority".

The Technician as Interpreter of the Syllabus

Only at National and Provincial were the topics to be covered per term, and sometimes, the sequence of topics, determined by availability of resources. But the experience of the laboratory technicians in the two departments were often used to interpret and implement the curriculum. Lloyd pointed out that, "here one soon learns that if you are a lazy teacher it's you who suffers. Because the laboratory technicians keep another work record, the practicals record book." Lloyd explained that every teacher must indicate in the practicals record, the date and time of the proposed practical, the number of students, and whether students will work in groups and how many groups or as individuals. Teachers must also list the materials, specimen and apparatus needed per student or per group. The technicians always inspected the record daily and then made preparations if the teacher's request presented no problem. If however, a teacher wanted to stage a practical for which specimens were either unavailable or more frequently, insufficient, then the technician would inform the teacher of the realities, and the teacher would re-organize his class procedures.

Expounding on the role of the technician, Lloyd added: "the biology technicians are quite important in influencing a teacher's classroom methodology and the sequencing of topics. They are more than just laboratory technicians. They have trained many teachers in the art of possible practical work. These fellows know what will work and what won't work". Lloyd explained that for many a new teacher textbooks are the most important source of experiments. But sometimes one cannot have all the ingredients needed to stage a particular experiment so that substitutes have to be used. "Our technicians have all these substitutes at their fingertips". A more important role of a good technician as a resource on workable practices, was identified by Lloyd in regard to textbook prescriptions for experimental work:

> "Textbooks often write out experiments as if students learned only biology the whole day. Sometimes the textbooks use an experiment that takes 2 hours to work when there is a simpler experiment which might take less time. But as a new teacher

> you don't know this. So our technicians use their immense experience to modify experiments by substituting steps and resources to lead to the most economic means to get experimental results. Many times I might not know where things are and how to put them together quickly and efficiently, the technician knows."

Lloyd explained that it was up to individual teachers to get an accurate record of the "new" experimental procedure designed by the technician and give it to the students. Technicians also frequently suggested the number of practicals needed for full treatment of a topic so that this number, rather the number of periods per topic, defined for the teacher aspects of the depth of coverage for particular topics. As a result, hours for teaching biology in forms 3 and 4 at Lloyd's school, were allocated according to the number of compulsory practicals each student needed and the number of topics set for coverage in a term had to fit into practical work timetables. Moreover, technicians know the duration of certain key experiments and often advised the head of department on the timetabling of lessons at particular form levels for example, on days where longterm observations could meaningfully be undertaken by students without interruption by other lessons in the same laboratories.

Lloyd was persistently reminded by teachers that he was "lucky" to have technicians who were trained as well as committed to their work. The technician who worked in Dalia's laboratory had been trained, but as Dalia pointed out, "he is not interested in the academic aspect of the laboratory. He will prepare what you ask him to get, but beyond that, he has not developed the interest in terms of keeping records of anything such as aspects of experimental work." Charity told teachers that at Urbana, the technician was not trained, "he is a young man who tries his best to provide for teachers' needs. But as technician for two laboratories, biology and physics, rather than a subject technician, and without a departmental system to inform him in advance of proposed practicals, he does not make advance preparations, and spends most of his time running between classes and laboratories during actual students' practicals".

Getting a Firm Grip on a Definition of Depth

Despite reliance on strategies such as work record-keeping, examination setting, and sometimes assistance from knowledgeable technicians, teachers had to decide the depth at which to treat a particular topic during classroom discourse because as Lloyd pointed out:

> "Regardless of how much discussion you hold with your colleagues before class, you as an individual, you have to stand in front of a class and at the end of it, have yourself and the class feeling that you gave enough content, not too shallow, not too deep, challenging yet sufficient."

How did teachers know when they had reached that balance point, and how did they define it? Lloyd admitted that he still did not have a formula that worked well for all classes after 12 years of teaching. Apparently, the difficulty in evolving a cure-all formula was partly due to the diversity of students within each stream and across different form levels. Lloyd pointed out that this problem was greater at forms 1 and 2, where students were still trying to develop interests and set themselves patterns for learning various subjects. At higher class levels, "the teacher knows that the students have the basic foundation of concepts in the subject. Students also know that they must read around and beyond the lesson in order to get a more in-depth understanding of the new concepts discussed during lessons." Teachers agreed with Lloyd that at higher levels, depth was much easier to handle by simply exposing students to all the concepts that teachers knew were required for public examinations purposes. Lloyd believed that it was not possible to provide sufficient depth on a particular topic for the whole class in such a way that none of the students would feel bored or be left behind. Giving his research class as an example, Lloyd stated that 20-24 students were average achievers, 10 high achievers and 6 low achievers. In teaching such a class, he defined "sufficient depth" by selecting a core of five average achievers and teaching the whole class as if it consisted of only these 5 students. The right depth of content was then determined mainly by the teacher paying attention to how well the five students performed on the following two criteria:

1. Giving a correct and full definition of the concept as required by biology.
2. Giving a correct and full definition of the concept as required in public examinations, school syllabus, and tests.

In addition, in expounding on the dimensions of particular concepts, Lloyd kept in mind three other factors namely:

1. The number of times students were likely to meet an expanded or a more sophisticated treatment of the same concept throughout the four years of secondary school.
2. Teacher's experience as to whether or not students generally found a particular concept easy or difficult to learn.
3. The depth at which the teacher has previously taught the concept and the main questions that previous students have raised while learning the concept.

Holding simultaneously in mind the two criteria and the three factors, Lloyd said that he would teach a concept focusing basically on the reactions of the five average achievers in class. The easier it was for these students to grasp the concept, the greater would be Lloyd's "feelings" that the concept had been treated at the right level of complexity and depth. However, Lloyd did not totally ignore the rest of the class:

> "If I explain something and I start getting confused questions from the average group or the top ten, then I have to backtrack. If I get correct answers from the low achievers, then I know that the top ten and many average achievers have been bored"

Charity told her colleagues that her strategy for gauging depth was different from Lloyd's. Convinced that regardless of what she did, one half of the class, at least, would not grasp much of the content, Charity could not base her definition of depth and her pace on students' reactions. Rather, "I teach from what I know the students should know. I know the right depth. I give explanation and more important, I give dictated or written notes so that if a student did not understand the classroom teaching, they can read their notes". Dalia stated that she was not consciously bothered by questions of gauging depth or moderating pace, explaining, "I use basically the concept as I know it. I also know the expected depth from what public examinations ask. I don't think students have any learning problems because of these issues. As long as the teacher teaches, they will learn". Lydia said that she had no one cure-all formula, but used many formulas depending on the topic, the students and the level of class. She challenged Lloyd as to whether it was possible for him to use his formula all the time. After a debate as to whether or not Lloyd ever felt himself "pushed" by impending examinations and other factors such as loss of class time because of school outings, Lloyd admitted that he could not always use the formula, explaining, "There are times when I must teach a topic the way I want to teach it. If it turns out to be too easy, that's not a problem. If it turns out to be too difficult for the students, then we work on simplification".

What was evident from the discussion was how experience was so crucial in determining the sequences, the depth and the pace of the curriculum at both school and classroom level. "Experience", "feelings" and "just knowing" were the operational words that signified important guidelines to teachers in their work. Asked how a new teacher without "experience" could cope with these curriculum demands, Lydia replied,

> "I think people are unfair to expect too much from a new teacher. A new fellow has to make mistakes. The point is: Does he learn from these mistakes?"

As to how a new teacher would recognize his mistakes and attempt to remedy them when he was the sole judge of himself, Lloyd explained:

> "I think this is where professional ethics comes in. To me this means that even in a school where there is a single teacher for each subject, there should be a curriculum committee to look at the results of students in tests in various subjects compared with national expectations which are fairly well represented by past

> examinations, and try to see what teachers can do. These curriculum committees could be drawn up along lines such as the sciences, the creative arts, the languages, the social studies and so on. It is difficult to believe that a teacher of physics is so ignorant as to have no clear notion of form 1 chemistry."

Lydia was quick to advise that a teacher ought to be very careful in looking at past examinations as indicative of "expected" national depth in treatment of various topics because: "I hear that often times these questions are not well set, and that markers construct new marking schemes - not quite the same as those provided by the original authors of the questions so that even here, gauging depth is still an issue to be sorted out".

Summary and Conclusions

This chapter began with a quotation from Lloyd expressing the futility of developing new curriculums at the national level, without involving the classroom teacher. Throughout the discussion, it became evident that the teacher is the authority in his classroom, certainly, in the crucial area of curriculum development at the school and classroom levels. It was interesting that throughout the discussion, teacher statements gave unexpected support to the kind of research activity in which they were involved. After all, the problems of curriculum development at the Curriculum Development Centre, the school, department, and at individual teacher level; and of interpreting official syllabi in lesson planning, during lesson delivery and during assessment of learning are essentially those of attempting to match content to an informed interpretation of the psychology of human learning in specific classroom situations. But since there is not a single psychology of human learning and since human learning of different types is probably needed for different purposes, 'real' learning probably takes place under many different situations. The matching process is therefore, difficult and can fail or indeed, be faulty at any of the points mentioned above due to at least three reasons. First, many findings from classroom empirical psychological research, which purport to test the processes of human learning behaviour, are inaccessible to many teachers in the classroom. Second, if and when these findings are accessible, the findings may be incomprehensible because of the paradigms and language used to describe and interpret classroom learning. And third, if the findings are understandable, they rarely, as Lloyd stated, represent reality as the classroom teacher understands it and confronts it on a daily basis. Teacher beliefs about the limited contribution of generalized theories of instruction, curriculum or class management to improvement in teaching were generally similar to assertions by other teachers who have engaged in reflective thought about their work (Lampert 1985). Therefore, teacher participation in reflective discussion of the nature reported in this chapter, probably enables teachers to gain access to emperical experiences from research and from other practitioners.

The utility of official syllabi, written schemes of work and lesson plans, as evidence of work covered in each classroom and the depth at which this work was handled, was shown to be extremely problematic in the teacher discussions. Some professional educators and teacher trainers have argued that since qualified teachers do not make use of schemes of work and lesson plans and yet continue to teach well, education courses should spend less time on teaching the skills of preparing schemes of work and lesson plans. Other teacher trainers and professional educators have countered this argument by stating that teachers do not teach well without written lesson plans and schemes of work but that the reason teachers do not make use of such schemes and plans is because they do not have the skills to prepare these aids. Therefore, education courses should spend more time teaching these skills and teachers should be encouraged or even be forced to develop and use these aids.

As is often the case, both arguments embody correct as well as faulty insights as the preceding discussion has eloquently shown. It would appear that the contibution of the official syllabus to daily teaching, although important, is short lived. Teachers appear to consult the official syllabus, perhaps, once a year to get a 'mental' record of the topics therein, after which the syllabus is shelved. Teachers do not appear to use the syllabus to derive goals and objectives for daily teaching. Schemes of work do not seem to fare any better, perhaps confirming recent research on teacher planning and decision making which have revealed that teachers typically do not use the the objective-based "rational" model stressed in textbooks (Brophy 1980) syllabi, schemes of work and teacher guides, but instead, concentrate on the topics and activities included in textbooks and concrete curriculum materials as they seem to relate to needs of students for examination purposes. Yet it is important to note that in a department where teachers made their own detailed syllabus, teachers were said to consult it frequently, since it provided information not normally found in official syllabi or schemes of work. But as was clear from subsequent discussion, teacher access to and use of a detailed departmental syllabus was supported by a constellation of other practices such as strong departmental leadership, systematic record-keeping, professional assistance from technicians and a school-wide concern for the intellectual interests and professional growth of teachers. This suggests that merely providing syllabi and schemes of work without other supportive services and practices, may not be sufficient to motivate teachers to make use of them.

It was also noted that teachers tended to regard the centrally prescribed syllabus as ambiguous and restrictive, implying that if teachers were left to plan and develop curriculums suitable in their individual classrooms, their teaching might become more effective. Research in the the U.S. where teachers generally have more discretion in classroom curriculum development suggests at least, in elementary mathematics, that even though teachers in theory tend to value such freedom, in practice they are often textbook-bound (Schwille et al. 1979). Elsewhere, Schwille et al. (1986) caution against the tendency to place teacher roles in curriculum decisions at the two extremes of professionals either excercizing independent judgement or following directives, instead of taking a middle position. They argue that viewing the teacher as a policymaker or political broker is one way to reconcile the polar positions: "from this point of view teachers enjoy enough discretion to be influenced by their own concepts of what schooling ought to be. But at the same time, teachers will choose (or be constrained to choose) to follow certain outside pressures. These pressures may be either consistent or inconsistent with what they want schooling to be" (Schwille et al. 1979). Such research would seem to underscore the need for careful thought in all aspects of curriculum decentralization to the school.

Teachers emphasized the difference between teacher training at college and 'learning teaching on the job'. A difference which should be useful in clarifying what a teacher trainee is expected to do while teaching at school and what he is taught to do during teacher training. At college a teacher trainee is taught how to handle a series of biology concepts that have defined dimensions of content, structure [illegible] application. On the job, however, "teaching teaches teachers" concepts that consist of defined dimensions of content but within a wider range of structures and applications in terms of age levels of pupils, intellectual development, conceptual demand, styles of cognition, social interaction settings, school and classroom contexts. A teacher cannot define these dimensions once and for all, since they are always changing. In addition, curriculums change. Since a teacher is often trained only once on how to learn to teach, emphasis in training should not probably and simply be on developing his skills for designing schemes of work and lesson plans, but more significantly, on skills that will enable him to transform knowledge and skills at different times in different contexts, i.e configure and integrate theory with practice in different school contexts.

For instance, the seminar discussions tried to configure and integrate knowledge about the theory and practice of interpreting curriculum for teaching, but teachers could not resolve the question of 'good sequence and proper depth'. What evolved was some notion of the various practices that teachers in different schools used, employing differing rationales to implement different practices and outcomes. Of course, teachers identifed shortcomings in each practice, but they came to learn that it would be futile to attempt to remedy these practices without first considering school-wide rationales that undergirded the existence of the practices. Yet teachers gained deeper insights into their "mental" and practical work.

As an observer in all four schools, I was suprised to find that what had at first appeared as 'doing nothing' in some schools, was after all 'doing something' and what had at first appeared as 'doing too much' in other schools was simplified after I learned why doing less would have amounted to 'doing nothing'. The foregoing discussion and summary suggests four recom- mendations for trainers of teachers, curriculum developers and school management.

1. Teacher educators should lay more emphasis on helping teachers to learn to reflect upon their work using theories about learning as starting points. Teachers tend to regard such theories as immutable and perfect and therefore, inapplicable in schools and to students who have known imperfections. Reflection should assist teachers to begin to resolve these and several other conflicts and lead to a healthier outlook toward the inherent contradictions in teaching and how theory can help to guide practice.

2. While there is still a place for a short and concise presentation of a national curriculum in the form of a syllabus document, syllabi meant as teacher working documents should have under one cover what are now called teaching guides and examination regulations for syllabi. It seems that one of the reasons why teachers ignore official syllabi is that they contain scanty guidance for teachers on the crucial issues of intepretation, sequencing and pacing of content.

3. Whenever new curriculums are designed, not only should classroom teachers be involved in the excercise, in order to infuse into the debate a proportionate amount of reality in the selection of content and methodology, but more sigificantly, be advised whether the new changes in the curriculum are in contenet, in methodology or both.

4. While national organizations such as teachers' unions, employers such as the Teacher Service Commission, and MOE Inspectorate should all continue to prescribe a 'code of professional ethics' for teachers, it is ultimately, the duty of the school head, school management and senior staff in each department to build and maintain strong departmental leadership through which genuine curriculum development, staff accountability for teaching, and teacher professional growth can be supported. Strong and insightful departmental leadership should encourage in-house censor by colleagues, which is so essential to professional growth; systematically guide new teachers; and set up a visible system of teacher and student support for teaching-learning.

Chapter 3

DEFINING FUNCTIONS OF QUESTIONS

> "There are times one is not in a mood to answer questions from students, that is, when you want to accomplish something. You have to cover a topic. But in either case, we assume too much..." Dalia (1984).

Introduction

It was perhaps inevitable that teacher attempts to analyse the structure and meanings of classroom events, by viewing video tapes of their lessons, would focus their attention on the issue of defining student participation during the teaching-learning process In classrooms where the average number of students is 38 to 40, teachers have to make critical decisions in order to involve students so as to actively contribute to the lesson. The most obvious strategies through which teachers can ensure student contribution to the lesson are to pose questions and to solicit questions from students. But teachers appear to have various purposes for either posing questions or soliciting questions from students. The discussion in this chapter presents these various objectives of questions as perceived by the four teachers.

Defining Student Participation

Teachers generally defined student participation in the teaching-learning process at three levels, always keeping in mind, the nature of biology as a practical subject, and the nature of "good learning" as defined by theories of learning that emphasize 'learning by doing'. The first and most frequently stated level of student participation was the degree to which students in class contributed verbally to the structuring of classroom dialogue and events. Two types of events were categorized under this definition, namely, students answering teacher questions, and students asking questions. The second level was student involvement in practical work such that each student, in fact, did something in carrying out the practicals. This definition was perceived as being most useful at the individual student level. But teachers clearly emphasized that under current school circumstances, with inadequate resources, materials and tools, this is an ideal that is rarely achieved. The third level of student participation was defined in terms of student activities such as making and maintaining a written record of the content they have learned and completion of assignments, including activities such as, class collection of specimens and observation of on-going experiments during student free time.

Functions of Questions

Teachers easily conceptualized student participation in their classrooms by referring to the function of questions. As Charity commented, "questions are so common - that sometimes you don't realize you have posed one". After viewing a number of tape segments which showed questioning episodes, teachers realized that examination of their questioning mechanisms and strategies was in essence an examination of teacher interaction with students. As earlier pointed out in Chapter 1, teachers preferred to tackle issues indirectly wherever their own roles were at stake, teachers therefore concentrated on identifying the different functions of questions which fortunately, lead to defining the social and intellectual contexts surrounding the evolving of questions.

Academic and Social Functions of Questions

Right from the start, teachers stated that questions served two main purposes, academic and social, and that a single question often contained elements of both.

The following question episode during Lydia's revision lesson on *Germination* illustrated the two purposes.

Kanini: I still don't understand what the endosperm is.

Lydia: You still want me to define the endosperm? After all this? (With a tone of dibelief and a sweeping gesture toward students).

Kanini: Yes.

Lydia explained during the seminar, that Kanini was asking for "another definition and description of the functions of the endosperm". Lydia stated that she had chosen the words in her response carefully, and that the tone and structure of her two questions were meant to tell Kanini, the student, and the class as a whole, that "I disapproved of Kanini's attempt to make the teacher repeat information that she had already dealt with". Yet Kanini's request was not denied, as Lydia repeated the required description of the endosperm.

Another example of a similar situation from Charity's class on the topic *Teeth* also illustrates the academic and social function of questions

Charity. Where do you expect to find this formula [dental]?

Faith. In dog.

Charity No.

Martha: In cat.

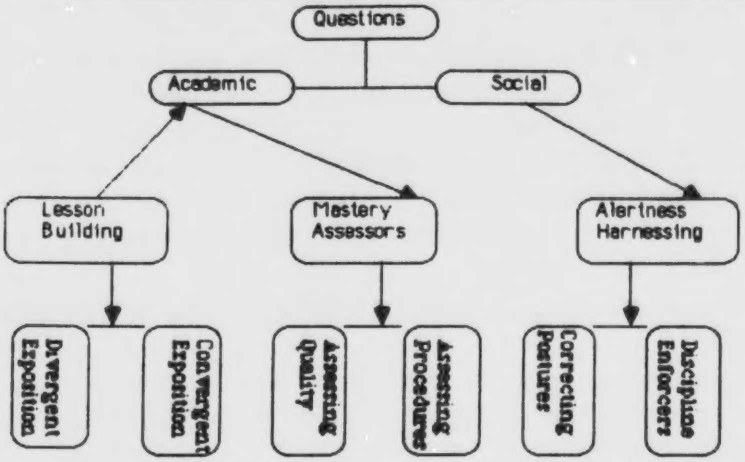
Charity. No!

Faith: In cow.

Charity Nooo!! Haven't you people looked in your mouths?

From the teacher analyses and descriptions similar to these two examples, and from constantly asking and reflecting on why they had posed particular questions, teachers were able to come up with three main functions of questions. They are: lesson building, masterly assessors and alertness harnessing, all of which were subsumed by the academic and social functions. Chart 1 summarizes the types of functions that teachers evolved.

Chart 1: Functions of Questions


Questions
Academic
Social
Lesson Building
Mastery Assessors
Alertness Harnessing
Divergent Exposition
Convergent Exposition
Assessing Quality
Assessing Procedures
Correcting Postures
Discipline Enforcers

Lesson Building Questions

Defining Points of Entry To Lessons

Most of the questions asked by teachers were for the purpose of soliciting information and new concepts from students in order for teachers and students to construct a lesson together. The underlying assumption by teachers was that students, either from their own experience or previous lessons, knew concepts that were relevant to the content of current lessons. The actual content might also be information students might reconstsruct from concepts given earlier within the present lesson.

For instance, Lydia's Form 2 lesson transcript covering the first 4.5 minutes of an 80 minute lesson on *Food Chains and Food Webs,* reveals clearly the purpose of questions as builders of lesson content as well as social controllers.

01. Lydia: Good morning.

02. Class: Good morning Mrs...

03. Lydia: Today you are nice and quiet. (with tone of suprise)

04. Class: (Exchange of knowing glances and nods of heads).

05. Lydia: Did we complete everything about the food chains...?

06. Class: Yes/No. (Lydia pauses and surveys class to imply annoyance at interruption by student chorus)

07. Lydia: ... so that now we can do something about food webs?

08. Class: Yes/No.

09. Lydia: I don't know whether you have all this in your books (Lydia moves from her desk, peruses through Anne's excercise book, returns to her desk). You were not asked to make any food webs?

10. Class: Yes/No.

11. Lydia: You were?

12. Class: We were not.

13. Lydia: I remember, I left you to copy the food chains on the blackboard. Have you completed that?

14. Class: Yes (some giggling at the back of the room)

15. Lydia: OK (long pause to show disapproval of giggling from the back) Now we will continue. Somebody had asked a question. What had somebody asked?

16. Class: (Silence)

17. Lydia: Someone had mentioned something about vultures which we could not say anything about. Before we go on, just a word or two about food chains. Give me an example of a food chain; the longest food chain that you have.

18. Class: A food chain?

19. Lydia: Yes. The longest food chain you have.

20. Lydia: Stella? (does not have hand up)

21. Stella: (Rifling through notebook) Uh. I cannot find the longest.

22. Lydia: Sara? (has hand up)

23. Sara: Rose plant->aphids->ladybird->insect-eating birds->hawk.

24. Lydia: That is a long one. Yes.

25: Lydia: What bird is this that is eaten by the hawk?

26. Class: Chicks.

27. Lydia: You have seen birds eaten by hawk? (with sceptic tone)

28. Cole: The small birds.

29. Lydia: What I wanted to know is whether you have seen birds eaten by a hawk?

30. Class: Yes/No.

31. Lydia: (Interrupting the chorus) No! Just put up your hand and tell us your observation. What have you observed?

32. Mona: I think it does not eat other birds except chicks, because it does not fly very well and therefore, cannot catch other birds.

33. Lydia: I see. That's a good idea. Did you get that? She says she does not think that the hawk eats other birds. The reason it eats chicks is because they have lost the ability to fly. So one could imagine that it might eat other chicks which cannot fly. So we might as well put it here (Lydia writes on food chain on BB) as chick or hen - to be specific, isn't it?

Teachers analyzed the different elements in structuring questions that build lessons. Lesson building did not consist of only compiling academic content, but also building class atmosphere (lines1-4), finding points of entry into the lesson (5-17), revision (9-17), and challenging students (17-20). But as can be seen in line 34 Lydia used Mona's answer in 33 to expand on (and reverse the meaning?) the topic of food chain. In several other episodes such as Lydia's, teachers pointed out the difficulty of separating academic questions from their social meanings, since context was important. For instance, Lydia explained that her comment that, "today you are nice and quiet" was to be understood as an appreciation of new student behaviour in the context of a class that normally made a lot of noise during transition, but which had been quiet 5 minutes after the bell.

According to Lydia, the first few questions serve both to assess learning prodecures as well as to give her a point of entry into the lesson. Teachers held a heated debate regarding whether or not it was ethical for a teacher to depend on student recall of what content had been covered during a previous lesson. Lydia and Dalia felt that the teacher did not ask these types of questions with total ignorance of where to start and how much he or she had covered in a previous lesson in order to determine a point of entry into a new lesson. The teacher had this knowledge. The function of these questions, "was simply a technique to get students involved in the lesson right from the start by remembering what they had covered before". Lloyd pointed out however, that Lydia's questions did not show that she intended to mobilize relevant student concepts, adding, "even though you refer to the nature of the coming lesson - Food Webs - your main concern is how much the students had completed in the previous lesson". Lloyd pointed to what he referred to as an even more disturbing aspect of Lydia's strategy, namely, the question: Did we complete everything about the food chain? To Lloyd this question suggested that either Lydia had given students a very clear notion of what exactly they were to do on the topic of food chains or that Lydia expected students to be able to know what consisted of "everything".

Lydia had perused a student's notebook at the beginning of the lesson, presumably to ascertain what students had done which, as her statement: "I don't know whether you have all this in your note book", would appear to suggest, she did not know. What did Lydia mean by all this? Lydia explained that during the previous lesson, she had discussed four different types of food chains, drawing them on the board. She had moved very fast through the 40-minute period giving a great deal of information. In fact, she had paused only twice to give students time to write. But at the sound of the bell, the students had not "copied" the food chains into their notebooks, yet they had to move to another lesson. This was why Lydia did not know whether or not students had managed to copy the food chains after the lesson. Even though Dalia found no fault with Lydia's technique, she said that she rarely, if ever, used it in her own class, adding, " I am a bit like Lloyd who keeps a very accurate set of notes of his lessons". Lloyd also pointed out that it was precisely the kind of student response and reaction which prevented him from posing that type of question. The inevitable 'yes/no' response always meant that the teacher had, as a next step, to check a student notebook in order to see who was telling the truth - those saying 'no' or those saying 'yes'. Charity agreed with Lloyd and Dalia, adding that for a teacher in her situation, where most students were lazy and rarely completed their work, if she looked at "the wrong notebook" she might re-teach the same stuff many times

However, what Lloyd referred to as the strongest argument against Lydia's purpose in asking "checking" questions, was that as a teacher, one wished to project an image of mastery of knowledge, and of being in full control of one's lesson in relationship to what to do, where to start and where to end. Lloyd felt that this was as important an aspect of teaching as giving the substantive content. He felt that teachers should avoid questions that portrayed them as lacking that firm grip on the events in a lesson and that confidence, which is crucially determined by the points of entry into a new lesson.

What the other teachers failed to grasp, and which Lydia herself knew but was unable to articulate to her colleagues, was that her technique fitted in and was in fact, a crucial element to her overall daily instructional strategy. Out of 78 periods during which Lydia was observed teaching, she asked this type of question at the entry into a lesson in 49 periods (62.8%). In 32 (65.3%) of the 49 lessons she examined a student notebook as part of the question but in 28 (87.5%) of these 32 instances, she did not begin where she had left off in the previous lesson. Was it possible that Lydia did not really know where she had stopped, or where to begin?

I encouraged teachers to search for a pattern among all lessons that Lydia had started with checking questions. This was a time-consuming excercise as teachers had to zoom up and down taped lessons in order to see the beginning and end of consecutive lessons and also skim through whole lessons to get an idea of the sequence of student activities. We found that the lessons prefaced by checking questions were a mixture of double (80 minutes) and single (40 minutes) periods and theory and practical classes. The only pattern among all lessons seemed to be the nature of the ending of the previous lesson. Using an edited tape showing only the beginnings and ends of lessons we identified15 taped lessons which formed "previous lessons" to the ones in which checking questions were posed at entry. In all 15 previous lessons, it seemed that students were not writing down anything but were simply listening to Lydia at the time the end-of-class bell rang. At this point the problem was solved for Lydia. She exclaimed, "Oh, I see!"

Lydia was always very strict about receiving complete student attention while she lectured. This meant that if a lesson ended while she was talking, students would not have time to make notes on what she had been saying. While students were taking notes, Lydia would go round, monitoring, marking, reading and suggesting changes and corrections to student notes. It seemed that the monitoring excercise enabled Lydia to get a notion of where students were at particular points in the lesson, so that she would probably make a mental note and decide on where to begin the next lesson. With no 'visible' record of work covered, and without the benefit of this 'final' monitoring, Lydia seemed lost at the beginning of lessons, and had to refresh her memory by asking checking questions and examining student notebooks.

Questions, Knowledge and Authority

It was interesting that even though Lydia failed to explain and argue her point clearly enough to convince her colleagues, she remained convinced that there was nothing faulty in her technique both professionally and academically. This was because, underlying the issue of whether or not to use checking questions, and peruse student notebooks, was each teacher's perception of knowledge and authority. Lloyd for instance, said that he feared to create the wrong impression among students. Charity feared that not only would she waste time re-teaching what she had already covered, but that, by looking at student notebooks and asking questions of entry, she would most pobably not get the correct answer to her question. Implicitly, Charity believed that the records of work of her students were prone to inaccuracy. Charity's perception of the ability of many of her students had led her to give up on the idea of "mastery learning". Her statement that "if you look at the wrong book" - implied that there was nothing more to be done for a student who had the 'wrong notes'. It would seem that while Lloyd's definition of authority was based on his fear of being a model of ignorance, Charity's definition of authority was predicated on fear of being misinformed by ignorant students. This subtle but important distinction reveals precisely the different ways both Lloyd and Charity perceived the capabilities of their students.

Lloyd saw his students as bright, alert and able to read beyond him. He believed that they followed lessons closely and understood the largest proportion of content. Three of the funniest episodes observed in Lloyd's research class were of three students who, when asked to repreat questions that Lloyd had posed, were unable to do so. On all three occasions, Lloyd threatened them with a punishment, namely, "to run around the block 10 times". As these threats were being made by Lloyd, the rest of the class was shouting: "*Murram! Cement!*", and roaring with laughter. *Murram* and *Cement* were the school nicknames for two local foods *NJenga* and *Ugali*. *Njenga* is made from loosely ground maize grains and *Ugali*, a thick paste, is made from finely ground maizemeal. The school's folklore was that if a student ate too much of either foodstuff, he tended to become stupid and forgetful of his classwork. The purpose of running round the block was to loosen the *Murram* and *Cement'* hold over a student's physiological processes especially, mental functioning. Lloyd might have suspected that if he had frequently begun his afternoon lessons by asking questions that suggested that he had forgotten the end point of the previous lesson, his students might have been tempted to shout at him "*Murram! Cement!*" .

Lydia, however, did not define her authority in these terms. While she appreciated the fact that a teacher should know her content, she was so convinced of this knowledge herself, that she could not see how it could be questioned by students. Moreover, she had built up an open relationship with the class which was fairly honest. If a student for instance, had not done homework, she would tell Lydia before a new lesson. Lydia's perceptions of the abilities of her students was as positive as Lloyd's. But Lydia expected students to have a good deal of explicit responsibility in keeping track of the wherebouts of lessons. There were several occasions when Lydia would ask her students, "are you sure?" -or she would conclude by stating, "alright, if you say we have done everything, let's go on". Furthermore, answers to many questions asked by students were left open, because as Lydia pointed out: "I didn't want the student to remain with the impression that I gave her that answer". In other words, Lydia wanted students to assume some responsibility for some of the accuracy of the content 'built' in class.

A segment from a lesson on *Food chains and Food Webs,* illustrates Lydia's emphasis on student responsibility for aspects of content built through questions.

01. Mona: ...some people eat dogs.

02. Lydia: Where?

03. Multhera: In the... (name of the country)

04. Mona: And I have read it in a book.

05. Lydia: Which book?

06. Mona: A book my parents have.

07. Lydia: Was it a novel?

08. Muithera: No. I have also read another book and it says the... (name of people) eat dogs.

09. Lydia: And you believed it?

10. Mona: Yes.

11. Lydia: That people eat dogs?

12. Mona: Yes (class laughs).

13. Lydia: Has anybody here seen people who eat dogs? (class laughs and five hands go up including that of Cole).

14. Lydia: Cole, you have seen them? (Class laughs.)

15. Cole: I wanted to give another food chain.

16. Lydia: No. Let us first make a note in our notebooks noting that in this last food chain, Mona and Muithera say that man eats dogs. (Class roars with laughter.)

In summary, the four teachers had different perceptions as to the function of questions that encouraged students to help the teacher to "find" a point of entry to a lesson. On one hand, Charity, Dalia and Lloyd believed that, in their own circumstances, these questions had no positive function. Lydia, on the other hand, used these questions frequently not only to serve the function of locating the entry point to a new lesson but also to enforce the responsibility of students in keeping track of content delivered during previous lessons. Apparently, a teacher's perception of the intellectual abilities of students may lead to viewing the functions of such questions in different ways.

Questions Leading to Divergent Exposition

A characteristic of lesson building questions which teachers addressed was referred to as divergent exposition. Teachers thought that Lydia's lessons were particularly prone to this feature. Lydia often admitted the difficulty she was facing in attempting to catch up with other teachers. She said she did not appear to progress at all. One reason for this was that Lydia tended to disgress more than any of the other teachers from a topic at hand. The "dog eating episode" that was quoted above, was an example of the type of digression teachers termed divergent exposition, because Lydia was said to have abandoned the main thread of a lesson by asking questions that went beyond normal classroom expectations. But teachers had difficulty in defining and agreeing on what was meant in practical situations, by digression and going beyond normal expectation. In order to understand the causes of digression, teachers examined episodes from each of the teacher's classes in terms of questions initiated by students and involvement of students in "visible" classroom activity.

For example, teachers observed that in Charity's lessons there was on the average very few questions initiated by students so that occasionally, a question might be posed either seeking clarification of something written on the blackboard in abbreviation, or seeking an explanation of a concept. After reviewing one of Lydia's lessons in which there were as many student questions as Lydia's, Charity had lemented, "some of ours will not ask even if they have not understood". Dalia's lessons were also characterized by an almost total absence of questions or even any kind of noise from students. After reviewing Dalia's lesson, Lloyd had commented, "you have no confrontation. Nothing starts at the other end. I would find that a challenge". Dalia had however, replied: "they were quite busy; it's a good class". Dalia's definition of student involvement in her lessons, even though theoretically congruent with that of her collegues, was different in practice. She tended to regard what she had referred to as the bustle and noise- a constant hum or even bubble, screeching of stools, reaching across benches, unauthorized talking, constant movement, chorusing, laughter- which was observed in lessons taught by Lydia, Lloyd and Charity as indicative of discipline problems. Lloyd's class normally posed several questions which were often subtly but strictly curtailed from straying from the point under discussion by Lloyd.

In order to undertand the causes of digression or lack of it, I encouraged teachers to consider how the different patterns might have developed during the first two terms of year 1 when teachers would normally set and reinforce rules for classroom behaviour. Teachers therefore, concentrated on identifying lesson episodes where teachers would define criteria for activities such as asking and answering questions, leaving the classroom, coming late, and using various resources. Teachers found that right from the first lesson, "hands-up" was required and expected and often demanded of any student who wanted to answer a question, to ask a question or to address either the teacher or the class. But as teachers examined subsequent lessons, they found that all of them tended to enforce this rule differently for individuals or groups of students in their classes.

For instance, Lloyd was able to reconstruct the process by which his class had come to learn not to ask "irrelevant" questions. Apparently, at the beginning of first term, about 14 very bright students occupied the first two benches in the laboratory. Whenever Lloyd demanded hands-up, his purpose was to evaluate how many students knew the correct answer and how many did not. Since Lloyd tended to gauge the complexity of his lesson and questions by concentrating on a core of 5 average students, he rarely solicited answers from the group of 14 bright students and those below average. In the case of the bright students, Lloyd argued that, "it is useful that those students who always know the correct answer do not put up hands all the time" In the case of the latter, Lloyd believed that, "if you are going to ask questions of the slow student, you need time and patience. And if a slow student gets too many questions wrong, I stop asking him because others will learn to make fun of him." Asked how the slow learner was likely to improve and get encouraged, Lloyd commented, "I will ask him only when I am almost certain he knows the correct answer". With regard to the very good student, Lloyd stated: "when I am really pressed for time, and I ask a question, then I will ask someone whom I am sure knows the answer. If you are in a hurry, you just want the right answer." Lloyd stated, however, that under normal class conditions the very good student in his class would keep putting up his hand, adding, "but I won't pick on him. The best thing is to ignore him. Somehow he comes to understand that you will pick him only as a last resort. He is not discouraged since he knows that he knows the answer and that you know he is good" On questions initiated by students, Lloyd had stated, " I do not allow certain kinds of questions. I have told my students that a question beginning with, I don't understand, is evidence of mental laxity. This way they will learn to ask clear questions."

Lloyd's resulting instructional strategy was therefore, one that encouraged expendiency in content delivery within a time perspective. This meant that over time, the bright students, who might have been expected to bring a new slant to the understanding of concepts through divergent questions, had been made the silent majority. The average students, who were allowed to be vocal, had severe curbs put on the type of questions they could ask. The low achievers seem to have been relegated to conduct their own battle of acquiring confidence. This is not to say that Lloyd's brightest pupils did not ask or answer questions. They did. But they never organized themselves in an influential, albeit unofficial, coalition to lead class events.

After Lydia had examined a number of episodes of digression in her taped lessons she admitted that she was aware of the disadvantages of digression. She pointed out that digression came from three sources. First, whenever she asked a lesson building question she often discovered, from student answers, that there was a definite gap in knowledge concerning some subsuming concepts. "I cannot bear to think they don't know or are not clear about these elementary concepts because if not, they will not understand the subsequent concepts". Second, Lydia realized that a full understanding of biological concepts in a particular lesson could be achieved by students only after they were able to recall some simple concepts which they had previously dealt with generally, in other subjects such as chemistry, physics, mathematics and geography. Lydia said that she knew that often, the students had covered such concepts but, " I try to put them in their biological perspective, and get the students to see the relationship to the biological concept at hand." Third, Lydia admitted that there were altogether too many student questions in her class. But she said that she did not want a solution to that "problem because it is not a problem".

In general, Charity, Lloyd and Dalia had problems similar to Lydia's with regard to the first and second causes of digression. The difference was in the instructional techniques the other teachers chose to deal with these problems. Lloyd and Dalia pointed out that they tended to be precise, explain the gaps in student knowledge, either of biology or of other subjects, and get on with the planned lesson. Lydia and Charity said that they tended to use the opposite technique, namely, soliciting such explanation from students through knowledge-building questions. This technique was always more problematic for Lydia than for Charity. On one hand, because Charity believed that she had an accurate perception of the intellectual capabilities of her pupils, she therefore, often arrived at the point of "giving the answer" to students earlier than Lydia. On the other hand, Lydia's underlying assumption was that, "If students tried hard enough, they would get it right". Lydia was prepared to give students as much opportunity as posssible to try, even if they digressed. Lydia was quite adamant when she stated, "I cannot move on without ascertaining that the student has got some form of answer, either from me or from the other students".

Questions Leading to Convergent Exposition

Lloyd's lessons were descibed by Lydia as convergent exposition because Lloyd consistently focused content and questions to only those points, concepts and elements that he thought were important. Lydia believed that this technique was not "very fair" to students who might want to know more than what was allowed by the teacher. Lloyd's reply to this concern was that classtime was not the occassion to debate student opinions on various biological issues, adding, " once you allow opinions as content, you open yourself to digression. I would rather converge my teaching to a few points than be led by student questions into all manner of opinions." The following extract from Lloyd's lesson on *Growth Hormones* shows the kind of convergence that Lloyd constantly brought to bear on the exposition of content and the use of questions.

01. Lloyd: I want you to look at the two diagrams 1 and 2. (two diagrams representing two shoot tips on the BB). Why is the shoot in diagram 1 bending?

02. Ndagi: Because the shoot has grown there in that part.

03. Lloyd: Why has it grown? And in which part?

04. Mark: Because it has no hormone.

05. Lloyd: Let me put markers here. (Puts signs at location of bending and growth.) In 2 you see the shoot is straight. But as it grows, as we said last time, it is bending to the left. Why?

06. Ndagi: Because the growth hormone which was concentrated there has gone away.

07. Lloyd: Now! What you are saying is that the shoot is affected by the hormone which has moved away - the concentration is reduced. This is what you want us to believe.?

08. Ndagi: (Silent)

09 Class: Yes.

10. Lloyd: What other possibility could have caused the growth? In this - let us call this section A, and this section B. What other possibility could have caused growth in section B? What other possibility would have caused it? There is still another possibility. Yes? (to Luke who has a hand up).

11. Luke: The hormones are running away from...

12. Lloyd: Oh its you! Do you know what you mean by running away? You can run away from me. (Class laughs.) But is it possible that the hormone runs in a plant? You can describe it better.

13. Luke: The hormones are moving.

14. Lloyd: Now, where is this hormone produced?

15. Luke: Ah.

16. Lloyd: At?

17. Luke: Ah.

18. Lloyd: At the?

19. Luke: A (shouting)

20. Lloyd: Aaa!. Yes, by what?

21. Luke: The plant.

22. Lloyd: No. There is still something wrong. Now listen. I did mention that the plant hormone is produced at the tip of the shoot or root. Let us be clear about that first. OK? Then what happens?

Lloyd said that he had two main reasons for using the kind of convergent exposition of content and questions that is clearly evident in the above episode.

1. Proper learning was enhanced if a student learned a few concepts at a time and learned these concepts in a clearly recognizable serial manner. Digression not only fragmented the topic at hand into many sub-concepts, but also introduced many differing concepts so that at the end of a lesson, both the teacher and the student were unsure of the main gist of the lesson.

2. Convergence discouraged fragmentation and devolution of sub-concepts thus making it easier for the teacher to "get on with the prepared lesson". Coverage of planned lesson content minimized teachers' feelings of exasperation and helplessness in case the class loses periods due to various factors.

Searching for the Answer

A characteristic of questions by Lloyd, Charity and Dalia was the frequent occurrence of a phenomenon which Campbell (1981, 1984) has described as "going for the answer". This phenomenon was only rarely observed in Lydia's classes. During question episodes there were many occasions when teachers wanted a specific answer, often a technical word or a phrase describing either a reason or a condition for some phenomenon. The use of this instructional technique was interesting in two aspects. First, the technique was often instituted when a teacher was hard pressed for time, and yet he wanted students to participate in building the lesson content by answering questions. Second, the technique, regardless of other conditions existing in the class, was in actual fact, extremely time-consuming. Teachers had explained that the purpose for 'going for the answer' was to enable students to get a correct answer, usually a technical word, a definition or description. Teachers were generally hesitant in using ordinary language to describe biological phenomena, arguing that students had a tendency either to generalize beyond the limited use of the common expression, or to stick to that common expression even though they had later, learned the technical expression. The solution, Dalia had explained, "is to ensure that you give them the correct terminology or expression the first time and that you insist on its use thereafter".

The phenomenon of going for the answer was not only a time-consuming technique but often undermined the quality of the very processes of student participation which its use was purported to support. Invariably, the teacher was tempted to ask many questions, rephrase them several times to the point of triviality and give increasingly more obvious clues, not only to the correct mental processes students were expected to use to obtain the answer, but also to the nature of the answer itself. An episode from Dalia's Form 2 lesson on *Germination*, reveals these increasingly obvious clues to the answer.

01. Dalia: We have seen that the seed, when planted can grow and we have named the factors necessary for germination. Who can tell us those factors again? What are the factors required for germination? What does the seed need in order to germinate? Hands-up! Yes Terri?

02. Terri: Water, food and warmth.

03. Dalia: Well, yes. Where does the seed get its food? From where in the seed is food stored? Yes Catherine? What stores the food in a germinating seed?

04. Catherine: The seed cotyledon.

05. Dalia: Yes. The cotyledon, when it is a mono-cotyledonous plant and two cotyledons when it is a ... a what? Someone? Ruth?

06. Ruth: Two cotyledons,

07. Dalia: No. The plant. What do we call it if the seeds have two cotyledons? The one with one cotyledon is mono. What is the one with two? Yes Catherine?

08. Catherine: Dicotyledon[s].

09. Dalia: Yes. Dicotyledon. Now we find water being a very important factor in germination. And how does this water reach the embryo? Catherine?

11. Catherine: By going through the cotyledons?

12. Dalia: But how does the water get to the cotyledons? Someone else? Yes Margo?

13. Margo: It softens the testa during germination.

14. Dalia: She says it softens the testa during germination. Is it?

15. Margo: Yes.

16. Dalia: The water softens the testa and the cotyledons during germination, alright? But when you soak seeds in water they swell. They take in water. How does water enter the seed ? Yes? I want hands. How do seeds take in

water? We discussed this last lesson. No books please. Yes? (to Terri)

17. Terri: (Stands up and looks blank).

18. Dalia: By what structure on the seed? Do you think the whole seed - the whole seed coat takes in water or there is something else? Yes? (to Margo).

19. Margo: Through the seed scar.

20. Dalia: Not the seed scar. But you are close. Yes?(to Margo)

21. Margo Through the tiny hole near the seed scar.

22. Dalia: Excellent. That hole, what is the name for it? Yes? (to Catherine)

23. Catherine: Through the micropyle.

24. Dalia: Yes! The micropyle. Through the micropyle.

Commenting on this episode, Dalia had pointed out that while it was true that she was looking for specific answers, the information in the lesson also served to revise concepts that students appeared to have forgotten. Dalia also pointed out that when a teacher gave a concept to a class the first time, he might put too much emphasis on describing the whole process, for instance, germination, but ignore to emphasize key subconcepts or words that are crucial to the process. In this situation, going over the content and zeroing in on these key words and subconcepts helps the student to master the total meaning of the topic. All teachers concurred with Dalia. Lloyd pointed out that teachers had to impart specific words and phrases during teaching, because it was such words and phrases that gave biology its character. Although teachers were concerned about the amount of time it often took to solicit from students either the correct technical word, a complete definition or a full description of a concept, they pointed out that it was better to give students the true and full meaning of concepts than to leave them with vague descriptions.

The foregoing discussion has shown the divsersity of teacher perceptions regarding the functions and accomplishments of questions they thought were for building lessons. It was also evident from both the lesson excerpts and discussion that each teacher's perceptions shaped the way she or he instituted and evaluated the effectiveness of the instructional techniques that included lesson building questions.

Lesson Assessing Questions

Teachers pointed out that student answers to lesson building questions frequently gave teachers an idea of how well students knew the information required by the question. But teachers had to ask specific questions to evaluate: the actual level of understanding by students, i.e., assessing learning mastery; and the progress of student accomplishments of various learning procedures and tasks, i.e. assessing learning procedures.

Assessing Learning Mastery

Teachers stated that they generally, used one strategy to assess the quality of student learning, that is, they asked questions at different levels of difficulty to see the proportion of students who knew the correct answer. However, since it was not possible to get an answer from all students, the teacher's overall assessment of learning mastery depended, not so much on the number of students giving correct answers, but on how many students raised hands probably, to indicate that they were able to answer the question. Teachers were well aware that this expectation was in itself problematic simply because students might raise hands for reasons that might be quite different from those perceived by the teacher. Lloyd, for instance, stated that when he asked a question he expected hands-up from, "Any student who has something to say, any student who wants to try, and anyone who knows the answer." Yet, Lloyd insisted that in forms 1 and 2, "the chances are very small that, if a student does not think he knows the answer, that he will put up his hand". Teachers argued that since students in forms 1 and 2 were still very self-conscious, they valued being correct, and

Dalia and Lloyd explained that, depending on the complexity of the question, they expected different degrees of hands-up. According to Lloyd, "if I ask a simple question then my purpose is to ascertain that it was really simple. The more hands I see, the better my prediction. Moreover, I want to get students to get into the habit of owning up to the state of their knowledge." Yet the teacher directive, " I want more hands", must have had the tendency to force some students who were unsure of the correct answer to a question currently on the floor, to put up hands. This might therefore, give a teacher the wrong impression regarding the number of students who had really mastered the lesson. Teachers insisted however, that this did not happen in forms 1 and 2, where students were very

Teachers discussed a subtle contradiction - at least from the perspective of students - as to the 'real' purpose of raising hands. Not only did teachers often select a student who had not originally raised his hand, but quite often, teachers selected a student who had totally refused to raise his hand. Lloyd pointed out that, "if the question you asked was simple, then you wish to ascertain that those not raising hands don't really know the answer. That's why you pick on someone who has not raised his hands. Now, if he gets the answer correct, then you know he has been pulling your leg." In addition, there was a tendency for teachers to demand for "more hands" and subsequently invite the whole class to work on the answer together. The invitation to the class to work on an answer together was often offered soon after the teacher had disapproved "chorusing". But Lloyd explained away this apparent contradiction this way: "when I ask for more hands-up, I don't mean for students to chorus or discuss among themselves. All I want is to gauge the number that knows the correct answer. When I invite everyone to work on an answer together, all I mean is that all students should be ready, since I can pick on anyone to give part or all of the answer." Whether or not in selecting "anyone" the teacher kept in mind those students who had not raised hands, was not made clear. What was clear through observation, was that whenever students were invited to work together on an answer to a question, they soon got tired of the unpredictability of the teacher's strategy of picking on anybody, and without further directive, student would start to raise hands, even though the original task might not yet be completed.

But Lloyd emphasized that if he selected a student who had not raised his hand to answer a question, it was rarely a random choice. Lloyd had three categories of students from whom he picked individuals in order to evaluate mastery of learning. First, if a question was really very simple, Lloyd would pick on a low achieving student - because he was quite certain the student would know the answer. Second, if a question was difficult, he might pick on a very bright student in order to get a correct answer - so that Lloyd may get on with the lesson. Third, Lloyd would sometimes, pick on what he described as "regressing students". Lloyd stated that in the research class, he had a few regressing students, for instance Mark. This boy had been a bright and active class participant in Form 1 . His academic performance had started to slip after the second term of first form. During three school terms in Form 1, Mark's class position had shifted from 7/39, 17/39 to 25/39. In Form 2, Mark's class position had slipped even further down to 27/39 and 31/39 during first and second terms, respectively. Lloyd explained that in Mark's case, it had been difficult to pinpoint the source of his problems until it had been discovered that Mark was spending less time on his assignments and class work since, "he had become the campaign manager for school candidates for the chairmanships of various clubs and societies." Teachers had been advised to talk to Mark outside class so as to try to get him to see the cause of his problem. Therefore, in fulfilling this school-wide policy of encouraging regressing students, Lloyd stated, "I try to keep an eye on him in class. I throw some easy

Assessing Learning Procedures

During the teaching-learning process, students had to participate in several activities such as carrying out experiments, observing specimen, making drawings, writing notes and completing short quizzes. As students engaged in these activities, teachers constantly posed questions such as: "have you finished?"; "have you got that?"; and " are you with me?"; in order to assess how closely students were keeping to the teacher's pace of exposition of content. For Lydia, for instance, this type of assessment was very important as she had to give students sufficient time to take their own notes after she had discussed a particular set of concepts. Similarly, in Charity's class, students were given time to write up experimental work and to prepare diagrams and drawings. Teachers stated that they had a general idea of how long it took students to make diagrams, observe specimen and write notes, so that the function of procedural assessing questions was not to canvass a yes/no answer. The real function of these questions was to control pace and noise, not only of those who had finished the assigned work, but also of many students who tended to talk while working. Lydia's class was particularly prone to this latter problem, and one of her most frequently used expressions during monitoring of student activity was, "you know you have not finished, but you are talking for some reason."

In Lydia's class, it was observed that one of the most frequent reasons for student talking was that students tended to ask each other to decipher the abbreviated notes made by Lydia on the blackboard, which students were expected to refer to in order to construct their own notes. Lydia said that she was generally, wary of students talking during note-taking, stating, "I cannot separate those who are just gossiping, those asking for help and those simply asking others to read a word for them from the blackboard". To curtail this type of talking and reduce uncertainity on her part, Lydia kept a continual stream of monitoring questions. She said that she did not think that the questions were a constant interruption to student concentration, since she believed that many of them needed the questions in order to evaluate their own pace. But Lydia admitted that sometimes, instead of using her assessment of whether or not all students had finished a task, so as to decide on the next step, she would decide to go on with the lesson due to what she described as pressure of student gestures.

> "Some of them (gestures) hit you hard. Some signs and postures are very discouraging; e.g. putting both hands on cheeks and both elbows on desk, sleeping on desks. This is terrible. The way they sit while writing! The screeching of stools, whispering, dropping rulers and mathematical sets of instruments - I try to correct. But it is difficult; and if you notice someone busy writing or reading, but sitting poorly, you decide that since she is working, let me not disturb. But generally those who have finished wait a bit for others. I believe it encourages patience. They will fidget, but I have to control it. However, sometimes it becomes too much. Then I will go on with the lesson, since there is little point waiting, as the noise and fidgeting will have disturbed everyone including those who have not yet finished."

Dalia had characterized Lydia's explanation as "unbelievable", adding, "why do you allow them to go that far? Surely, if I feel students should keep quiet, they should be able to do it. Yours - I don't know. I think you have spoiled them. You are too soft. They take advantage of that." Dalia explained that once in a while, she monitored student work progress by questions such as: "have you finished?; and "how many people are still writing?"; but she added that she made it absolutely clear to students that talking before, during and after completion of work was totally unacceptable in her class.

Questions to Harness Student Alertness

Lydia's statement quoted above suggested a problem that was faced by all teachers, namely how to keep the students motivated and alert particularly, in the non-practical classes. As Dalia pointed out, "you cannot expect interest to prevail all the time - because some content is, by its very nature, boring. So sometimes you need some injection of special motivation. But it is difficult to find what works for all students". Teachers stated many times that questions to build lessons or to assess learning mastery were really for the purpose of keeping students alert. As Lloyd once explained: "I know how to catch those not paying attention. I will describe something. Then without posing or changing the tone or pitch of voice, I will ask a question. Those who were not listening will not be able to give the correct answer to the question or repeat the question itself". Dalia pointed out that she often had to resort to asking undirected questions in order to encourage alertness in the whole class, adding, "if students learn that you always identify a student before posing a question, they will soon decide not to listen to the question itself."

In addition, some teacher requirements that students stand up while they are answering questions although often thought of as a practice to enncourage respect, was apparently, for the purpose of harnessing concentration, not only of the speaker, but also of the rest of the class. Both the waste of time spent by students in 'getting to their feet', and the noise generated as students pulled and screeched stools, which this practice entailed in crowded classrooms, were considered by teachers, as a small price to pay for the effect it had of "awakening everyone". Moreover, standing up had another purpose as Lydia explained: "it is difficult to understand what they say when they remain sitting. They simply tend to murmur or chorus. So I want to have one person clearly identifiable as the speaker".

Only Dalia and Charity had a class rule requiring that a student who had failed to answer a question correctly, should remain standing. Both teachers believed strongly that in many cases, students got answers wrong not because they did not know the correct information, but because they rarely listened properly, to classroom discussion and questions. Therefore, to encourage students to be more attentive, a punishment was attached to any failure to get the correct answer. Lloyd and Lydia, however, considered the practice as a triple punishment. They pointed out that in forms 1 and 2 a student will already be very embarrassed by giving an incorrect answer, and that this should be regarded as sufficient punishment. Moreover, Lloyd and Lydia did not consider standing as a corrective to the problem of lack of concentration and attention, asserting, "the students will become more self-conscious while standing and will in fact, listen less". Since students who were standing had to continue writing, not only were they likely to block both the teacher's view of some students and vice versa, but students who were standing were likely to develop poor postures, produce shoddy work and create problems in situations where teaching-learning resources had to be shared. For these reasons, Lloyd and Lydia said they preferred to let students sit down even after they had given wrong answers.

Summary and Conclusions

From this discussion of teacher perceptions of the purposes for asking questions, three main points have emerged:

1. Asking of questions by teachers during lessons although highly dependent upon contextual factors, serves several academic and social functions. Although the three major functions, namely; lesson building, assessing mastery of learning and harnessing student alertness would appear to embrace worthwhile goals, such goals are likely to be unattainable in many classroom situations.

2. Teachers do not normally ask particular questions that serve a limited number of possible functions. Rather, depending on the context in the class as continuously evaluated by the teacher, several purposes may be served by a single question.

3. Teacher practical theories and perceptions regarding the nature of the teaching-learning processes, the quality of the learning abilities and motivation of his students, influence, to a high degree,the type of functions that the teacher might ultimately perceive his questions to serve.

These points suggest a number of issues concerning the validity of asking questions as a teaching-learning technique. Since shortage of time appears to be a severe limiting factor in attempts to 'cover the syllabus', it would appear that teachers should spend as little of this time as possible on a technique which takes a lot of time; rarely achieves specific purposes; and is more likely to be used for the wrong reasons.

Curriculum developers and teacher educators frequently exhort teachers to use questions in order to involve students in the teaching- learning process. It would appear from these discussions that since the definition of students' participation is itself problematic, the full value of using questions as a participatory technique can be realized only after teachers have deepened their understanding of contexts, beliefs, perceptions and practices that determine classroom participant structures, within total school contexts. In the following chapter, the likely fate of instructional innovations undertaken by teachers who had only a superficial understanding of the contexts of their schools and classrooms, underscores the indespensability of a deeper understanding of teaching-learning contexts to the improvement of instruction.

Chapter 4

IMPLEMENTING INSTRUCTIONAL CHANGE

> "The sermons of the headmistress on teaching are bound to fall on deaf ears because she always puts the blame where it does not belong "
> Charity (1984)

Introduction

In Chapter 1, some of the procedures and factors that were crucial to establishing meaningful partcipation by teachers in the project were discussed. In chapters 2 and 3 the content of teacher discussions during the seminar were presented. Those three chapters, were dominated by a presentation of teacher observations, comments, statements and perceptions. In this chapter, devoted to the implemention of instructional change in classrooms, although teacher perceptions and comments form a substantial part of record, they are considered within the broader context of the researcher's own observations and interpretations of the implementation effort. In discussing various elements of each teacher's implemention strategies, emphasis has been placed on analyzing how the school milieu, the social organization of classrooms and overall teacher instructional strategies, all interacted and influenced the structure, success and stability of new instructional techniques. Data collection and interpretation were guided by four questions:

1 Did teachers develop concrete idea of various instructional changes needed in their classrooms, and set out plans to implement such change?

2 What instructional changes did teachers implement? How did they implement such changes and for how long?

3. Since the instructional changes that were considered for implementation had been suggested to teachers during seminars, was there evidence that teachers had a clear notion of what techniques

they wanted to change and what steps they would follow to bring about the

4. Was there evidence that teachers had, through discussions, reached new levels of understanding and interpretation of various contexts in their schools, and had catered to such contexts in evolving the implementation strategy?

Development of Ideas for Change

Throughout various seminar discussions, teachers had been encouraged to speak their mind, but the implicit understanding that each teacher would be free either to heed or to reject suggestions for change from his colleagues remained ambiguous. Teachers were expected to help one another not only by describing individual perspectives regarding what was good or bad practice, but also by suggesting alternatives to current perspectives and practices. This was not always easy to achieve as the following incident illustrates.

During a seminar in early 1984, teachers discussed the quality of student passes in various subjects on public examinations since the 'O' level results for 1983, had just been released. The schools of Lloyd and Lydia had obtained good results while Charity's school had poor results. Dalia had commented that the results in her school had been reasonable in view of the initial abilities of students and the quality of facilities supporting teaching. Dalia had further explained that the nature of the mock examination questions was crucial in order to alert students as to how well they might perform in a real examination. Lloyd suggested that the mock examination was not as important as the kind of teaching and revision that was done as a follow-up to the mock examination. Lydia said that the most important factor was the type of questions set in the mock examination since these questions gave true practice to students on how to answer the real examination questions. Charity had suggested that the reason why students in her school had performed poorly was perhaps because she and staff in her department did not know how to set proper mock questions. After inspecting and comparing the 1983 mock examinations question papers from all schools, Charity had exclaimed, "these are the very same questions that we set for our girls. Why don't ours do well? These are the very same questions we had."

Teachers were quite surprised after they had compared the mock questions across schools as well as the mock questions with the 1983 public examination questions on biology, noting that:

1. The questions for the mock examinations from all four schools covered 25 different topics, and that there were only the information requested was unique to a particular school.
2. In only Charity's school was there a question that bore a relatively close resemblance to a question in the public examination papers.

Teachers debated the merits and demerits of the various questions in reference to what Lloyd, Lydia and Dalia had said about the crucial role of the mock examination, but they failed to reach a consensus on what could be defined as "the most important function of the mock examination". Finally, Charity stated, "obviously, with our students, I don't think that the mock matters any more. Even if you probably gave them the real public examination questions as the mock, they would still mess up both examinations."

At this point the three other teachers "attacked" Charity insisting that the reason why students in Charity's school were not performing well in examinations was because, "teachers like you give-up on the students long before the students give up learning". Lydia insisted that teachers at Charity's school did not attempt to help students as much as possible with both their social and academic problems. When this debate had subsided, Charity insisted that teachers should view tapes taken in class in order to appreciate some of the problems in her classes, adding, " you should see for yourself." Teachers had viewed a compiled tape consisting of eight segments from lessons during four consecutive weeks of observations. I explained to teachers that in each of the eight lesson segments, Charity had threatened a student, Faith, with expulsion from the "next" biology lesson, unless Faith brought her notebook to class. I further told teachers that since up to the last lesson taught, Faith had not brought her notebook to class, they might wish to suggest ideas on how Charity should deal with the problem during her next lesson. The following is a verbatim excerpt from the discussion among teachers that followed viewing of the tape.

01. Dalia: Why doesn't she have a book.? I could not hear very clearly all her reasons.

02. Charity: She says she lost it.

03. Dalia: Ask her to buy a new one.

04. Charity: That is what I have been saying to her in every lesson. But she says her mother says she has no money.

05. Lloyd: Three shillings! And a parent doesn't have that much for a book?

06. Charity: She is lying, of course. But what else do I do?

07. Lydia: Why don't you get her a book from the school?

08. Charity: How?

09. Lloyd: Don't you have a system where you give students a new book if the old one is finished?

10. Charity: We do. But I have to sign in the back of the old book that is finished as evidence. But Faith does not have a finished book.

11. Lydia: Why don't you explain to the head of school the case and get her to get Faith a new book from the school funds?

12. Charity: Recently, one girl lost all her household property, including her books, in a fire. I went to the school store and signed for two new books for her, with the reason clearly stated in the record. When the head of school saw the store record, she called me and told me the school cannot afford to give away school property on such flimsy excuses. The head said I should not repeat it, and I am not going to repeat it, because then I shall have to pay for the books,

13. Dalia: If Faith has an older book, take that one.

14. Lydia: But it will already have a signiture if she took it to the store to get the next book.

15. Lloyd: Tear off nicely the last page (laughs) and sign the next page again.

16. Charity: The storekeeper, they count the number of pages at the store.

17. Lloyd: Actually, I was joking because we too count the number of pages. If they don't add up, the student pays for the new book.

18. Dalia: Buy her one yourself.

19. Charity: How many books will I buy? This sort of thing is very common in our school.

20. Lloyd: So what are you going to do if she has no book next lesson?

21. Charity: I will send her to the deputy, who I am quite certain, will do nothing much. The deputy will just send her back to my class without a book.

22. Namuddu: So what other advice can you give Charity? She has a class on Monday morning.

23. Lydia: I think in some of these schools, the best thing is not to advise since we don't really know what else is going on, which is not on tape.

During that seminar, the matter was left at that point. At the next seminar, I told teachers that after I had previewed a tape containing the above discussion, I had concluded that while each of the teachers had 'given advice' to Charity, depending on procedures and mechanisms that were practical in their individual schools, practices which made sense to the teacher, they had not considered how such advice would fit into a different school setting. During subsequent review of the same discussion, teachers kept on commenting, "Did I say that?" By the end of the review, teachers appeared to have arrived at new state of consensus, namely, that they would disagree with each other, question each other's practices and beliefs, "attack" each other, but they would not try to force each other to do something a teacher did not consider right from his perspective.

Teachers also discussed the role of personal initiative. We described facts of "habit" that might become blinders to possible alternatives to current perspectives and practices and attempted to draw differences between expressing opinions and giving advice. We made it clear that expression of differing points of views was mandatory but choosing to act or not to act upon any expressed opinion was an optional and voluntary exercise. In addition, we emphasized the fact that even in a single classroom, the nature of good practice would not always be the same, and that there was probably a continuum from good practice to bad practice where the line separating goodness and badness, might often be quite fine. To give an example of this continuum, teachers reviewed, several compiled episodes on student questions in order to assess the validity of a hypothesis I had defined, namely, that the more questions students ask, the better the lesson.

Teachers first viewed six episodes from lessons by Charity and Dalia. Using the hypothesis, teachers described the lesson as bad since there were very few questions. Teachers were encouraged to advise Charity and Dalia, and subsequently, several strategies such as demanding questions, giving question-generating assignments, holding brainstorming sessions and challenging students with problematic situations were suggested. Lloyd told Charity and Dalia: "you are not working hard enough to get students to participate in the lessons". The two teachers defended themselves explaining that they had tried to involve students in lessons, but Lloyd and Lydia said they did not agree and suggested they should try harder. Lloyd concluded the discussion by asserting, "all that these students need, is encouragement, then you will have many more questions than you can cope with. I do not agree that good or bad manners and brains have anything to do with asking questions."

Teachers then viewed a set of three episodes from Lloyd's lessons. These were rated good since, as Lydia pointed out, "there were quite a few questions". But both Dalia and Charity were somewhat surprised that there had not been more questions. Dalia said to Lloyd, "after seeing yours, I don't feel so bad". Teachers then viewed two segment from Lydia's lessons. In one segment, students had asked 32 questions in 20 minutes and Lydia had attempted to answer them all one by one, as well as often asking other students to give their own opinions. After viewing this segment, Lloyd had asked Lydia, "what was your planned lesson? These girls have kidnapped your lesson". Lydia insisted however, that she did not mind the barrage of questions as long as the students were learning. Dalia thought the girls had gone too far, asserting: "it is sheer cheek; and would be unacceptable in my class". Charity said she wished she could export her students from Urbana to National in exchange with Lydia's. Although Lloyd insisted the student questions were too many, he said that he had found the responses from the girls fascinating, "I think girls are much more livelier to teach. They are creative. They are fun. Your Form 1 are like my Form 4 class. The students constantly remind me, 'sir, you have not yet answered Tom's question which he put to you five minutes ago'. Only a week go a student interrupted my explanation to tell me that another student had put up a hand and had a burning question for the last five minutes. I have a special relationship with this class. They are very close to me".

Dalia who had been listening to Lloyd's animated explanation with a large measure of scepticism, said that she thought all that was too emotional to be useful in her school situation, adding, "you would think otherwise if you were with girls. They would take advantage of you. They demand special treatment." Charity said that she was only amazed to hear that there were students in fourth form who still enjoyed learning even in the third term of their public examination year, adding: "ours give up long before that - they just sit in class and day dream - that is, if you can get them into class."

Lloyd and Charity ranked Lydia's lessons as good. But Dalia said that the lessons were bad because even though there were many questions asked by students, Lydia had failed to control the class. In discussing what kind of advice teachers could give to Lloyd and Lydia, teachers pointed out that my original hypothesis that, the more questions asked by students, the better the lesson, was not "always" valid because, as Dalia explained:

> "I would advise Lydia to control her class so that she can teach. In fact I don't think I still feel as bad as I felt earlier, because Lloyd's lesson, which I think was good, did not have many questions- only about six- by students, and I think that is just right. But Lydia's lesson, that's a discipline problem. Students should be taught to control their asking of questions. My advice, well to me, I will try to get my students to ask questions, a few at least. Same for Charity. Lloyd is OK. Lydia well, teach more."

When Dalia was asked whether or not she contended that students learn from their questions and answers, she explained: "of course they learn, but not from that many questions. Who now knows what was taught in that class? It was all bits and pieces". Lydia said that she was not going to take Dalia's advice because, as far as she was concerned, she had taught. She added, "OK, so there were many questions. And I don't know what to do. But what you are saying is not right. If your students put up hands, would you ignore them? In fact when you ignore their hands and questions, they become upset and fidget even more."

Teachers had discussed several other labels of student behaviour, such as; dull class, active, noisy, lazy, motivated, bright and several others, by reviewing lesson episodes similar to those quoted above. Teachers came to appreciate that the meanings and interpretations of these concepts, which they had always taken as self-evident and theoretically defined as umbrella terms for behaviour in general school situations, had fine re-definitions quite unique to particular schools and particular classrooms. Student behaviour in asking too many questions, for instance, which had been interpreted as a good learning technique by the classroom teacher, was regarded as a purely discipline problem by another teacher. Similarly, what Lloyd regarded as closeness to his students, had been interpreted by Dalia as unnecessary emotional attachment.

Discussions and comparisons of this nature led teachers to a deeper understanding of 'good' and 'bad' practices in classrooms. Equally important, teachers came to evolve a broader definition of "good" and "bad" schools. At the beginning of the discussion Lydia had given teachers a guiding theme on this somewhat sensitive issue, when she had stated, "to many teachers, teaching in a good school is not really palatable. There is too much work." During a later seminar where teachers grappled with the question of whether it was easier to teach in a high achieving or a low achieving school, Lloyd had retorted, "I would like those people who claim that the kids in good schools just pass their examinations, to come and work here for a week. They would run away as soon as they realized that it is a 24 hour job". But was it true that there was more work in good schools and less work in poor schools?

It took a long time to gather data and information to help teachers define the concepts of hard work and much work. This was partly because at the beginning of the research project all the so called "good" schools were boarding while the so called "poor" schools had only a small group of boarding students and the other school a day school. But by the middle of the project, a very large proportion of students at District were boarders. The case of District, enabled Dalia to keep track of the "increasing amount of non-academic workload" created as the institution moved from a predominantly day school to a boarding school. This experience provided teachers with deeper insight into the definition of hard work, at least, at three levels, so that they could debate meaningfully on which aspects of this work influenced students outcomes. First, teachers were able to identify work that was done by teachers regardless of whether the school was boarding or day. Second, teachers identified work that was done by teachers specifically because the school was either boarding or day. Third, teachers identified "extra work" in boarding and day schools. Dalia's experiences were useful in cataloguing the emerging responsibilities of both teachers and pupils as more and more students became boarders. And in Dalia's own situation, the range of responsibilities was probably far greater than would normally have been the case. Because the school had few staff members who were resident on campus, duties and responsibilities which would have been shared among 30 teachers were being shouldered by only 8 teachers.

At Urbana where school started at 7.45 a.m. and closed at 4.00 p.m., all teaching, duties and responsibilities had to be undertaken during this short period when students were in school. For instance, clubs, societies, prep, assignment completion, games, and a modicum of housechores all had to be done either before or after class. Teachers therefore, arrived at a consensus, that a school whether boarding or day, demanded hard work from teachers, but that the definition of hard work varied within and across schools. After teachers had examined the purposes of the three levels of work, they were convinced that a ubiquitous characteristic of all schools was the "creation" of unnecessary extra work for staff and that most of this created work was often counter-productive to teacher efforts to do academic tasks. But teachers appreciated the fact that the "created" work did serve a purpose in particular school contexts. Teachers arrived at a general conclusion, namely, that the more a school worked to reduce, simplify and co-ordinate this "created" work, the greater were the chances, that teachers would concentrate on academic tasks, with the result that the school would most likely improve on the scale of academic performance - becoming a good school. But all teachers agreed that work or hard work, was sometimes as emotional as it was physical. What counted was that at the end of each day, the teacher was always tired. If, on one hand, the work that had sapped a teacher's physical and psychic energies was for the benefit of pupils - in class and outside- teachers said that they felt good about it. If on the other hand, the work that had exhausted them and taxed their nerves had been for the benefit of an administrator's file, while to the teacher it was still work - hard work- teachers looked upon it as ultimately more exhausting work than classroom work.

By reflecting on similar issues within the wider context of schools, it was possible for teachers to decide on particular changes they wanted to make in their current instructional strategies. Both the process of selection and implementation were quite fuzzy as is clearly shown in the following section.

Implementing Instructional Change

In the general concept of the project, every teacher in the project was implicitly expected to implement some instructional change but only after being convinced that such change was necessary and that it would make a difference in the classroom. Yet it was important that teachers should not be made to feel that they were under pressure to implement change or that the quality of their implemented changes was constantly being judged by the researcher. Against this background, the following assumptions were made regarding teacher willingness to implement instructional change:

1. If a teacher was observed not to have attempted to implement any of the alternative techniques suggested by his colleagues regarding his instructional strategy, it was assumed that: either the teacher had not been convinced of the usefulness of such alternatives, or he had simply not wished to implement change.

2. After teachers indicated during the research and seminar evaluation excercise, whether or not they were planning to undertake defined instructional changes and when and how they were intending to go about the task, teachers were not directly interviewed about instructional changes. It was assumed that if the implemented changes were real, it would be possible identify them during normal classroom observation.

3. If a teacher was observed to have implemented instructional changes, clarification regarding the implementation strategies and the stability of change would normally be sought during seminars, pre-active, and post-interactive interviews as general discussion.

Instructional Techniques Targeted for Change

During discussions and video tape analysis, teachers isolated various instructional techniques that individuals said they wanted to either initiate or modify in some way. Chart 2 below lists all instructional techiniques that the four teachers, Dalia (1), Lydia (2), Lloyd (3) and Charity (4) identified as requiring some form of change in their overall instructional strategy. The actual changes in instructional techniques that were implemented by each teacher areshown in column 2. The period during which the implemented changes were observed to have been sustained as part of the teacher's instructional strategy is reported in column 3.

Chart 2: Teachers' Changes in Instructional Strategy(T-Teacher[1,2,3,4]; 1= nature of change: n=new; i=improving on existing techniques; 2=actual change implemented;3=duration of change)

Instructional Technique	T	1		2	3
		New	Impr.		
1. Systematic monitoring of student practical work	1	-	-	-	-
	2	-	-	-	-
	3	n	-	x	Up to end
	4	-	i	-	-
2. Student notes made in classroom	1	-	i	-	-
	2	-	-	-	-
	3	-	-	-	-
	4	-	i	-	-
3. Systematic lesson planning.	1	-	i	x	1 term
	2	-	-	-	-
	3	-	-	-	-
	4	-	-	-	-
4. Insistence on student classroom notes.	1		i	-	-
	2	-	-	-	-
	3	-	-	-	-
	4	-	i	x	1 term
5. Motivate students to ask many questions during lessons	1	n	-	x	4 weeks
	2	-	-	-	-
	3	-	i	x	Up to end
	4	-	-	-	-

Continued

Instructional Technique	T	1		2	3
		New	Impr.		
6. Ask low achievers more questions	1	-	-	-	-
	2	-	-	-	-
	3	-	i	x	Up to end
	4	-	-	-	-
7. Use school compound more as learning resource	1	-	-	-	-
	2	n	-	x	1 lesson
	3	-	i	-	-
	4	-	-	-	-
8. Encourage students to interact with each other in practicals and use each other as resources	1	n	-	x	4 weeks
	2	-	-	-	-
	3	-	-	-	-
	4	-	-	-	-
9. Give quizzes to evaluate pupil understanding of concepts	1	-	-	-	-
	2	-	-	-	-
	3	-	i	x	Up to end
	4	-	-	-	-
10. Give students more time to think of answers before giving answering	1	-	-	-	-
	2	-	i	x	Up to end
	3	-	i	x	Up to end
	4	n	-	-	-
11. Use words such as think, analyze etc to encourage	1	n	-	x	4 weeks
	2	-	i	x	Up to end
	3	-	i	x	Up to end
	4	-	i	-	-
12. Deliver instructions for practical work at a slower pace	1	-	-	-	-
	2	-	-	-	-
	3	-	-	-	-
	4	n	-	x	1 term
13. Encourage students to elaborate their answers to questions	1	n	-	-	-
	2	-	i	x	Up to end
	3	-	i	x	Up to end
	4	n	-	-	-
14. Allow students to structure some of the steps in instructions for practical work	1	n	-	x	2 lessons
	2	-	-	-	-
	3	-	-	-	-
	4	n	-	-	-
15. Increase amount of work done in small groups	1	-	-	-	-
	2	-	-	-	-
	3	-	-	-	-
	4	n	-	x	1 term

Altogether, 32 instructional techniques were considered by teachers as possible targets for either initiating or modifying in various classrooms. But only 15 of these techniques were actually implemented and tried out for various periods during the life of the project as shown in column 3. The chart also reveals that even though fewer techniques were considered for inititating as "new" (11) as compared to those considered for modification (21), teachers actually implemented about an equal number of instructional techniques from each category. In general terms, Dalia identified nine instructional techniques four of which she considered for initiating in class while five were for modification. In actual fact, she implemented three out of the four "new" instructional techniques and modified one out of the five she was already using. Lydia identified only one "new" instructional technique -using the school compound as a learning resource-which she wanted to initiate, but considered four techniques for possible modification out of which she was able to implement three. Lloyd implemented two instructional techniques he identified as "new" and three techniques out of the five he wanted to modify. Charity was able to implement three out of four new techniques and modified only one out of seven which she had identified as requiring modification. What was the nature of the implementation process for each of the four teachers?

Dalia's Instructional Changes

Dalia was observed to have identified four main weaknesses in her overall instructional strategy. First, she said she was not devoting as much time as possible to the systematic planning of her lessons. By systematic lesson planning Dalia meant, "I don't think, I am able to judge very well, what we are able to do in a particular period, in view of what I end up doing". Second, Dalia said that it was often difficult for her to isolate objectives for a specific lesson within the broad goals of teaching particular topics. Third, she said that she was spending too much time on revising content of previous lessons before embarking on a new lesson. Fourth, as will be recalled from discussion in Chapter 3, Lydia, Lloyd and Charity had described Dalia's class as generally very inactive so that Dalia wanted to get the class to become more active.

In actual fact, Dalia's idea of improving her lesson planning was the result of two frequent comments made by her colleagues on her video lessons. In the first instance, quite a few lesson episodes had shown Dalia announcing a series of objectives to the class at the beginning of a lesson, which were then followed by lesson activities or instruction which had little to do with the objectives. For instance, at the beginning of a lesson on *Germination*, Dalia had announced, "today we are going to watch the process of germination". The rest of the lesson had however, been spent on revising the structure of seeds and on planting seeds. In another lesson, with the objective of describing differences between insect and wind pollinated flowers, the largest proportion of time had been spent on describing the characteristics of mono-cotyledonous plants. In the second instance, Dalia was rarely able to "cover" her planned lesson. As a result of these two comments, Dalia had felt that she had to do something about her lesson planning.

A common characteristic of video tape segments from Dalia's lessons was the large number of students caught by the camera staring absently at either the camera or outside, while Dalia was talking. Moreover, many students, particularly the girls, seemed to require a certain amount of coercion in order to get them to start on assigned practical work. During first form, Dalia's class had consisted of only girls. At Form 2 however, half the number of girls had been moved to a different stream and their places had been taken up by boys. It was observed that girls often sat quietly by themselves and appeared to fear mixing with boys during practical work. Lloyd had at one point asked Dalia: "when do your students talk? Do the girls talk at all? Dalia had replied, "they are too quiet. I don't know what is going on. But something is wrong with that class. They are too quiet".

Subsequently, Dalia had implemented four instructional changes namely: systematic lesson planning; motivating students to ask questions; encouraging students to interact with one another and to use each other as a resource during practical work; and encouraging students to use specific cognitive processes in processing and learning new information. Generally, Dalia attempted to get students, particularly girls, to be more active during practical work. Dalia did not talk about the various instructional changes she had implemented but it was observed that:

1. Whenever Dalia attended pre-active and post-active interviews, she would ask several questions regarding lesson planning, and the effectiveness of various new lesson sequences I had observed her using during lessons.
2. Dalia would prepare fresh lesson plans for all lessons including lessons she taught in language and in non-research biology classes. Her lesson plans were more systematic in outlining and sequencing the major concepts in a lesson.
3. Dalia had become very conscious of using class time and would constantly review her lesson plan during the teaching-learning process, presumably, to ascertain that she was sticking closely to it in order to be able to cover what she had planned.
4. Dalia had instituted a more comprehensive monitoring system of students whenever she assigned students group or individual tasks
5. Dalia would attempt to evaluate lessons by asking questions at the end.
6. Dalia would demand more systematic and detailed work from the students.

With the exception of a file of lesson plans, she did not have a record of her new or modified instructional techniques. Beyond these in-classroom changes, Dalia was observed spending more time in the staffroom reading, at least, three different reference books before writing down her lesson plans. She was particularly throrough in preparing the laboratory for practical work, collecting the needed materials, improvising quite a lot of apparatus for experiements and double checking with the laboratory technician regarding specimen.

But the actual implementation process was observed to be quite haphazard. It was quite obvious that Dalia implemented changes she selected, more or less, at whatever stage she saw fit. It did not appear that she had a definite plan. During the same period, Dalia had also became very conscious of being video-taped. She had pointed out that she "hated it", whenever I appeared to tape a lesson when she suspected she was not as prepared as she would have wished. Similarly, she would get quite upset whenever she felt she was quite prepared for her lesson and I would either not show up or would come without a camera.

Dalia's Reaction to Student Responses to Changes

It was observed that student responses were a major source of consternation to Dalia as she constantly tried to evaluate the effectiveness of her instructional changes. This was particularly so with regard to her effort to effect an overall change that would bring about new modes of interaction among students, conserve time and reveal the positive results of systematic lesson planning. What Dalia found however, was that the student pace of activity was too slow to accommodate her own perceived sense of the kind of interaction needed among students. What she therefore, did was to section each lesson into such tiny sequential segments, so that she could then monitor student activity effectively, while at the same time conserving time. For example, during a lesson on the structure of the seed, Dalia and the class performed the following tasks.

1. Dalia demonstrated how to study a soaked bean seed, (3 minutes) draw it (3 minutes) and label the diagrams(3 minutes).

2. Students performed the task (10 minutes), as Dalia went around the room monitoring progress.

3. Dalia demonstated how to squeeze the seed (3 minutes) and write down observation (2 minutes).

4. Dalia demonstrated, using very detailed instructions how to split the seed longitudinally (3 minutes) observe the inside parts(5 minutes) and what to draw (2 minutes). Then she resumed monitoring.

5. Students performed the tasks (15 minutes), as Dalia monitored progress.

6. Dalia demonstrated how to remove the embryo from the cotyledons (5 minutes), identify the plumule and radicle (5 minutes) and draw the embryo (2 minutes).

7. Students performed the tasks (10 minutes), as Dalia monitored progress.

8. Students had just started looking at a maize grain in a similar manner, when the end-of-class bell rang.

Looking at the above steps of the lesson, it is evident that examining one specimen had taken 80 minutes. Dalia hac explained earlier that the objective of the lesson was to identify the key structures of seeds. Students had therefore, made six large diagrams of various structures, but when, during the next single lesson two days later, they were asked to identify the structure called the micropyle, no one had the slightest idea. Why? Jane, the student I had sat next to during the previous lesson, had drawn a full page diagram of a micropyle, and while Dalia talked of a "tiny hole" just above the seed scar, Jane flipped through her notebook containing the large diagrams, but she could not locate one representing a 'tiny hole'.

Increasingly then, Dalia found that the more she 'sectioned' the lesson into smaller and smaller segments for the purposes of monitoring, introducing opportunity for student interaction and effecting proper use of time, the more frequently she had to re-teach stuff she had earlier covered. She often discovered, through evaluative questions, that students had not made the linkages in the content, which she had assumed they would make. Dalia felt frustrated and slowly reverted to her original classroom sequences. I wondered whether it would have made a difference if Dalia had alerted students to the new instructional changes or if she had tried to keep a record of her changes and activities. When at the end of her 'project' I asked why she had abandoned the techniques, she was a bit shocked to learn that I "had been watching" and she said, "I think some of these things are not going to work very well when you have our kind of students."

In the final analysis, however, two factors and probably not "the kind of students" were responsible for Dalia's abandonment of the instructional changes she had implemented, namely the unpredictability of the research timetable and Dalia's increasingly diverse and extensive workload. First, with regard to the unpredictability of the research timetable, each teacher strived to have lessons captured on tape when they believed they had either been well prepared for the lesson or had taught very well. For instance, teachers often asked me to preview specific lessons because: "I think I was alright in that lesson". But because the taping of lessons was unpredictable, Dalia increasingly came to feel that because only the worst of her lessons, were being taped, she would be unable to get me to tape one of her better lessons. Eventually, she lost the motivation to 'stage' lessons with 'special' techniques for me and reverted to her usual instructional strategy.

A more detrimental factor to Dalia's efforts to implement instructional changes was Dalia's increasingly diverse and extensive workload. In July 1984 Dalia was made deputy head of the school. As head of her family while her husband was away, as the teacher responsible for overseeing the boarding section of the school, as deputy head in a school where the school head was frequently absent, and with a heavy workload both in biology and language teaching, Dalia had very little time for pre-active preparation and thought about her teaching. She often had to miss her class while "filling in" for the school head. More than ever before, Dalia had to "catch up", makeup" or "cover" lessons and under the circumstances, it was hardly possible for her to worry about the details of new instructional techniques. Dalia's teaching became more of simply giving content, whenever she was available, than of evaluating how the content was being learned by students.

It was also observed that Dalia's new and elevated status affected not only her classroom work, but also her participation in the research in three subtle but important ways. First, a deputy head of school is an important and senior position in school. And in a co-educational school, as was the case at District, the deputy is often of a different gender from the head of school, so that for practical purposes, the deputy's status is seen more as that of the "head a section of the school's students who are not of the gender of the school head. More significantly, at District Dalia's new status and position meant that she had to implement on a daily basis the school's total policy as well as administer routines such as executing "big" punishments to students, and censoring student dormitory behaviour. It therefore, became increasingly difficult for students in the research class to continue to regard Dalia as just an ordinary classroom teacher It would have been impossible for students to ignore Dalia's directives given at assembly on the need for absolute obedience, conformity and silence in class at all times, in order to become questioners, challengers and visible interactionists during Dalia's lessons. Inside and outside the classroom, students came to treat Dalia not as simply a biology teacher but as a deputy head of school.

Second, Dalia's own personality underwent some visible change after she became deputy head of school. The new status and position removed her from the noisy and crowded staffroom to a quiet separate office. But this meant isolation from her colleagues. Perhaps more significantly, Dalia soon discovered - like many administrators are bound to- that "former" friends were not the easiest group of teachers to administer. Dalia once explained in frustration, "I have finally got to know that all my friends are different. I think people are difficult to manage. They want you to let them off just because they are friends". Obviously, Dalia had to adopt a somewhat tough stance with her friends. This stance might have filtered through to the classroom as earlier mentioned.

Third, it was observed that during seminars, Dalia who had initially been very open and critical of her school's policies, had become more defensive against any criticism of her school in general and of school administrators in particular, than she had been previously. It was as if she could no longer trust the other teachers, who in turn subtly revealed that they could no longer 'trust her judgement fully', even though they never actually discussed the issue directly.

For instance, during the latter part of 1984, the schools' divisional athletics and sports competitions were being played and both the District High and National High netball teams were in the same division. A day before one seminar meeting, the two teams had competed and District had defeated National. During the seminar, Dalia, Charity and Lloyd began by talking about the two teams. Dalia pointed out that the coach of the team from National had not realized that District's team (which was being coached by Dalia) was very experienced. At this point Lydia came in and the following brief exchange ensued:

01. Dalia. We beat your girls yesterday.

02. Lydia: Where? What was it?

03. Dalia: In netball. We beat them.

04. Lydia: Oh! I did not know that! Whom are you playing next?

05. Dalia: These were the semi-finals. We don't know who will win in the 2nd division.

06. Lydia: Oh! You are that high! I thought you were just beginning.

07. Dalia: No! We too can be good at something!

When, two minutes later, Dalia went outside the seminar room to re-park her car, Lydia commented, "she has become a real politician". Ultimately, Dalia was able to devote increasingly less time to the total research program than other teachers. She had too many responsibilities and sometimes, this created minor irritations to other teachers especially whenever she failed to collect and present various forms of data during seminars. Dalia's case clearly illustrated that since gradual change in instructional strategy require time for planning, implementation and reflection at every stage, combining too many duties is likely to affect the outcome of change. It is quite possible that had Dalia not become deputy head of school, at the very time when she was trying to introduce change in her overall instructional strategy, she probably might not have abandoned the implemented changes as quickly as she did.

Lydia's Instructional Changes

Lydia identified only one "new" instructional technique that she wanted to initiate, namely taking students out more often to learn biology using resources in the school compound. But Lydia actually implemented this technique, only once, for a few minutes during the life of the research project. Lydia was observed sending students out to collect materials. Before students left the laboratory, Lydia had told them that they would have10 minutes in which to collect different types of fruit. Lydia did not go out with the students as she said she wanted to set up the laboratory for the rest of the lesson. During the first 3 minutes after the students had left, Lydia worked on setting up various stations. Then she became nervous, wondering loudly what the students were doing. Within the next 2 minutes she went out and re-called the students back to the classroom claiming that they were wasting time and gossiping. When she observed that only a few girls had found any fruit she said, "Well you can use my fruit. We have plenty here."

Lydia however, identified four other instructional techniques for modification. Lydia had pointed out on three earlier occassions, that she wanted to encourage students to interact with each other more and use each other as resource during practical lessons, but she again did not implement any noticeable changes in this teachnique. What Lydia actually implemented and improved upon, were three related instructional techniques, namely: encouraging students to use specific cognitive processes required in processing information when words such as think, imagine, analyze, synthesize, compare etc. are used in teacher questions to students; giving more time to students to think before giving answers to her questions; and encouraging students to elaborate on their answers. As can be seen from column 3 of Chart 2, these 3 instructional changes were carried through right to the end of the research project. However, why did Lydia not implement one technique which she had said she wanted, abandon another technique after only a few minutes of implementation, and stick with three other techniques right to the end of the project?

It would appear that Lydia's abandonment or pursuit of a particular instructional technique depended very much on whether or not it would fit into her existing overall instructional strategy. It is not possible to give here even a brief description of Lydia's instructional strategy, but such a strategy rested on at least, two crucial beliefs of Lydia, namely: that she was the most accurate source of biology content; and that a constant 'bird's eye view' of the whole class was indispensable to proper teaching. The technique of using the school compound as a resource during teaching and learning biology was abandoned by Lydia precisely because it violated both beliefs. In the first instance, Lydia could not keep an eye on the whole class while they were out of the laboratory, and she was unsure of the authenticity of student biological information to each other while students were out of the classroom. Similarly, the second technique, encouraging students to be resources to one another, not only violated one of Lydia's beliefs concenring her role as a resource for accurate information but was also probably unnecessary in her situation. Students were already interacting sufficiently with one another so that Lydia probably realized that her encouragement of students on this front, would simply throw the class into chaos. When Lydia had been asked why she thought the students needed more interaction with each other, she had replied, "I am not sure really. I suppose they already make enough noise". Lydia implemented and carried through to the end of the project, three other techniques precisely, because they were changes that fitted in very well with Lydia's usual instructional strategy, so that they actually demanded very little effort from Lydia, not only to implement them, but also to sustain them. Moreover, Lydia believed that these techniques worked and were useful for student performance in public examinations. When for instance, I asked Lydia whether or not I was correct in my observation that students were giving longer answers to her questions, she replied:

> "Oh, I have been really encouraging them to explain things. They are required to do this in the examination and tests, so they should practice it. I know sometimes it is not possible to give more than one

> word as answer but I have now decided to ask questions that provoke them into debate. It is good for them.

Furthermore, Lydia's students had no problems with these modified instructional requirements since the majority enjoyed talking and giving opinions, so that these instructional modifications only helped to refine students' own derived strategies for sustaining speech and dialogue with Lydia, rather than having her keep them busy with written tasks. In the final analysis, however, Lydia did not consider seriously that she needed to change much of anything in her overall instructional strategy. Even though she sometimes indicated that she felt exasperated by gaps in student knowledge, she was not really ready to change anything substantial. She had once asked me what I thought was lacking in her teaching method. When I pointed out that I did not think that she used time very well during the teaching of basic concepts and skills, she was adamant that changing the pattern of time use would not change anything with regard to student ability to recall and use these basic concepts and skills for later work. In certain aspects, Lydia was the most puzzling of the four teachers. She was much more open about some of her own feelings about herself, her work, and her pupils than any of the other teachers. Yet, her absolute belief in the right of individual opinion often prevented her from expressing her true feelings about other people's opinions. This meant that while she was a willing participant, she, more than of the other four teachers, could in a real sense, "get away without doing anything".

Lloyd's Instructional Changes

Lloyd identified two techniques, namely, systematic monitoring of student practical work; and use of words such as think, imagine, analyze etc., to encourage student use of specific cognitive processes as instructional techniques that he wanted to initiate. Five other instructional techniques, namely: taking students out more often to learn biology using the school compound resources; posing more questions to low achievers; giving quizzes and short tests to evaluate student understanding of concepts; giving students more time to think of their answers to teacher questions; and encouraging students to elaborate on their answers; were identified for modification. Lloyd just like Lydia, implemented mainly those instructional techniques that fitted into his existing overall instructional strategy, except for the techniques on systematic monitoring of student practical work. During viewing of tapes from Lloyd's lessons, his colleagues had told him that he spent too much of his monitoring time looking at work of only those students sitting on the front bench and on the right side of the laboratory. Lloyd had finally admitted that he had been "biased" and promised to change to a strategy that would embrace students at the back. Lloyd appeared to have done some systematic study of the students and the relationship between where they sat in the laboratory and the quality of their general performance, before implementing his new techniques. He explained for instance, that he had found out that the "backbenchers" were mostly students of average ability. The new monitoring strategy that was implemented, was observed to consist of basically the opposite of the monitoring strategy used before, because now, Lloyd almost totally ignored the students sitting at the front of the laboratory, and instead, concentrated on the last two benches. After three weeks of Lloyd's implementation, I had asked Lloyd whether or not, in his effort to monitor the work of students at the back and sides of the class, he had not ignored the front bench totally, and Lloyd had replied, "I know the fellows at the front are serious. They are not interested in wasting time. They don't need my supervision".

During the next seminar, teachers viewed a segment from Lloyd's practical lesson on *The Structure and Function of Wood Vessels*. Lloyd had brought into class cuttings of geranium previously soaked in red dye. The students were required to make transverse sections of the stems, observe these with hand lenses to identify which tissues had stained red and which ones had not, make diagrams of their observations and interpret the meanings of these observations in terms of the tissue functions. The video tape showed mostly activities of students on the first bench, but also made periodic sweeps around the whole laboratory so that the activities at the front bench could be seen in relationship to where Lloyd was and what he was doing at particular points in the lessons. Briefly, the lesson proceeded as follows:

> First, Lloyd was seen at the front bench demonstrating the procedures for the task - all the class was attentive. After five minutes, Lloyd had asked students to collect materials - the stem cuttings, a knife, razor blades, and a hand lens for each group of 4 or 5 students. Soon all students were back at their stations with the materials. The front bench with 8 students had, alone, collected 10 stem cuttings - (other benches had an average of three each), 6 hand lenses (instead of the mandated three per bench) several knives and a boxful of razor blades. After the next 10 minutes, during which the frontbenchers made a lot of noise, Lloyd brought in 4 large mounted hand lenses. He gave one to the front bench and one to each of the other benches. For the next 25 minutes, Lloyd remained at the back of the class demonstrating procedures and helping students to cut sections and view them correctly using the hand lenses.
>
> Meanwhile, at the front bench, a game of 'seek and hoard' was being played by students using the large hand lenses. By this time, the front benchers had divided themselves into three groups, each with two small hand lenses. The problem was to share the large hand lens. Everyone wanted it - but not necessarily for viewing the stem cuttings, at any rate not at first. As the lens was passed and snatched from hand to hand, and tested by various students to magnify nostrils, fingernails, eyes, patches of leaves, watches and other objects, Lloyd did not turn around even though at that point, the frontbenchers were generating enough noise to arouse the curiosity of students on the second bench. At the second bench, Githinji, who was ordinarily a very active student, had managed to 'steal' a second big hand lens from the third bench, while some of its owners had wandered off. But Githinji could not keep the lens on his bench without its owners dicovering it. He had therefore, moved to the front bench, and with the help of one of the groups of frontbenchers, had hidden the lens between an erected square of textbooks. Whole stem cuttings were gingerly laid across the top of the structure, and whenever it appeared as if another student was looking for the lens, it would be quickly covered with other books, faces would be drawn long and straight, and the seeker would pass without comment.
>
> Meanwhile, the two remaining groups of front benchers were still fighting to control the original big lens. As the lens was passed from hand to hand, two of the tripod legs slipped out of their sockets clattered on to the floor, and it was at this point that Lloyd called the class to attention. Lloyd had wanted to know which students had not finished. Quickly, many of the frontbenchers made the required sketch from the textbook, purporting to show what they had seen,

> labelled everything in pencil and were ready by the time Lloyd got to his front desk to "recapitulate" the work. The recapulation saw Lloyd make a diagram of the stem section on the board. He labelled its various parts A - B - C - D and asked students to describe their observations. At this point, the camera had caught many of the front benchers, not with their hands up ready to answer questions, but busy erasing their earlier flimsy sketches and replacing them with the large solid sketches similar to the one that Lloyd had drawn on the blackboard.

After Lloyd had watched the video tape segment he commented: "These fellows have let me down. I thought they were serious about their work." Subsequently, Lloyd had organized a more equitable system of monitoring class events. This new system consisted of first, gradually easing Lloyd's grip on assigned group members and their work and allowing students to re-organize themselves into groups that suited them, as long as these groups did not disrupt classroom work. Second, in monitoring student work, Lloyd attempted to balance his time between giving help to students who sought and needed help most, perusing around the whole class, and standing at the front desk more often in order to take a bird's eye view of the laboratory. It took Lloyd about 4 weeks to install all the elements of this modified system and he stuck to it up to the end of the research observation period.

It was perhaps, important that Lloyd, unlike Lydia and Dalia, had decided to tell his colleagues about the instructional changes he was making and the progress of these changes. These exchanges with his colleagues plus a more consistent effort to view tapes of his lessons outside seminar sessions, probably enabled Lloyd to come up with and investigate other aspects of his instructional strategy related to the problem of monitoring student work. Lloyd seemed to have had a clear concept of both the purpose of the instructional technique which he wanted to initiate and the processes of its implementation. At first, the effect of the implementation process had resulted in positive instructional change for the specific target group, but it had also introduced new problems to the rest of the class. However, in order to evolve a balanced system of monitoring and arrive at a proportionately effective technique for the whole class, had required Lloyd to make two other changes which he had not originally perceived as related to the monitoring of student work. In the first instance, strict assignment of students into groups had to be eased. In the second instance, Lloyd broadened his definition of monitoring from simply believing that monitoring was most effective when Lloyd dealt physically with individual students, to the appreciation that monitoring by taking a bird's eye view of the whole class, was sometimes, equally effective.

Charity's Instructional Changes

Charity had identified seven techniques, four of which she wanted to initiate while the rest would undergo improvement. However, only two techniques, namely, increasing the amount of teacher control over student group work, and encouraging students to make their own notes were implemented. Charity appeared to have selected the most crucial techniques to change in her overall instructional strategy. Two problems frequently discussed while viewing Charity's lesson episodes were the organization of student group work during practical periods and dictating notes to students. Lloyd, Dalia, Lydia and indeed, Charity herself, had found the conduct of practical work by groups of students in Charity's classes exasperating. Lydia for instance, had once commented after observing three groups of students doing the same experiment, "none of the students in any of those groups started there. In that group the students have been changing. Was that what you wanted? I don't see how it works."

Charity had not set up formal student groups in the Form 1 research class. She had left students to set up their own groups - more or less- during each practical period. This was not an unusual practice in this research project as both Dalia and Lydia did not have formally mandated groups. What was interesting, however, was that while in Lydia and Dalia's classrooms students had managed to consolidate their own group members, so that more or less the same students worked together in almost all practicals, many of the students in Charity's class had failed to form similar bonds. This is not to say that all students did not eventually have their groups.

There were about 15 students who formed three semi-permanent groups with two or three members as a core in each group. The other 25 students however, tended to attach themselves to various groups not only from one practical to another but also within a single practical session. I came to define this constantly moving group of 15-25 students as 'an idle mobile periphery' to characterize both their stucture and their status in terms of responsibility for classroom work. These students were constantly moving idly and were peripheral, in structural terms, to a group that had a core, and to the learning processes which were being undertaken by the core group members.

By focusing on this idle mobile periphery, teachers had advised Charity to do something about the organization of group work. Teacher analyses of lessons in terms of trying to follow a student from one group to another, had revealed that even in the second term of first year (1983), Charity knew only a few names of her students. Lydia had attributed a great deal of what she called "lawlessness" during practicals, to this fact, because as she argued, students probably felt anonymous and were therefore, tempted to do whatever they wanted, knowing that the teacher would be unable to call them to task by name. Charity was therefore, advised to prescribe formal and mandated group membership. Initially, Charity tried to learn more of her students by names and during the weeks in which Charity worked consciously on this task, there was always an atmosphere of surprise among students whenever she called them by name. It seemed that after Charity had got about 15 faces and names tagged, there was realization by students that "she knows you". The tagging of students by name, was a positive and exciting phenomenaon in the class while Charity worked on it, because for the first time, fewer numbers of students felt themselves anonymous during lessons.

Charity did not however, opt to take the second piece of advice from her colleagues regarding the formation of formal groups. Instead, she decided that whenever there was a practical, she would identify the leaders of a group. Charity did not want to discuss the issues regarding her new ideas on group formation, but at an informal discussion with three members of staff in the biology and physics departments at Charity's school, I gathered that in the science classes formal and permanent group formation was discouraged in the school for two main reason. First, since the level of daily absence was high among students, permanent groups would always be difficult to work with, and re-grouping would have to be done in the case of absences. Second, teachers seemed to believe that since few students had much interest in science, especially at forms 2, 3 and 4, it would be unfair to condemn a student - particularly an interested student- to a permanent group where other members may not be motivated enough to do the work.

In Charity's class there seemed to be another reason, perhaps even more poignant than these two. After all, the average level of absence in Charity's research class was four students per lesson. Even though students who were usually absent tended to differ more or less each lesson, absence would not have severely disrupted permanent grouping. But there was a high level of lateness in Charity's research class and other classes. During first form, this level was on the average, 9 students each lesson; and after the second term of second form it had dropped to about four. Charity had been consistently observed doing her lesson preparation in her head, using the ideal textbook requirements for allocating resources and prescribing personnel. If for instance, an experiment had four main tasks, Charity would prepare a lesson where students would have to work in fours, so that each student would have some task to do during the experiment, as was demanded by Charity. But not all experiments had four tasks, some had only 2, others 9 or 10 or even more. If Charity had set up permanent groups, she would have probably had to combine and devolve groups at each practical in order to cater for more or fewer tasks in various experimental situations. The best solution therefore, seemed to be to leave the groups open and subject to formation, composition and dissolution according to a particular practical at hand.

There was theoretically or practically nothing wrong with the strategy. In fact, the strategy, theoretically at least, embodies all the elements of individualized planning and implementation so often recommended by teacher educators. However, in Charity's case, there was one major problem. Charity often had very little time in which to undertake, herself, the actual preparation of learning resources such as: test tubes, microscopes, hand lenses, plants, leaves and any resources needed for experiments. She often had to rely on the assistance of an untrained laboratory technician who had little experience of classroom needs, had several other errands to perform, and had to work in two laboratories where several classes may be in session at the same time. On Mondays, Charity would begin by introducing her experimental lesson from her "prepared lesson in the mind". But whenever it came to have the students break up into groups, Charity would discover that either equipment and resources were not available or more often, they would be insufficient for the kind of student grouping she had been talking about. Charity would then have to make 'repairs' to her earlier procedural directives concerning grouping, use of resources, or sometimes even the number of experiments to be carried out in any one particular lesson.

A situation had developed therefore, where a mental lesson planning strategy that had been set up to cater for three other problems, namely: student lateness, student absenteeism and the need for each student to undertake some task during practical work, seriously undermined the very instructional advantages the strategy had attempted to achieve. It is pointless to ask whether the situation would have been different had Charity set up permanent groups. It would appear that Charity had probably been correct to reject permanent groupings since some of the influences on her instructional strategy lay with the school's management policies that dictated allocation of resources and the sharing of these resources by teachers. These were very difficult problems to work around. In the end, students grouping did not evolve along the lines that the other three teachers and myself had perceived it would.

Encouraging Students to Make Their Own Notes

The origin of advice to Charity about her student note-taking procedures was similar to that regarding grouping and name tagging. Through viewing tapes, teachers had observed that Charity was not encouraging students to learn this necessary skill. Charity dictated notes directly while students copied them. Other teachers felt that students had to learn to take their own notes in order for them to develop the skill of narration, description and explanation through writing. At the beginning of the seminars, Charity had insisted that her students could not compose notes on their own, asserting, "they will write nonsense". But her colleagues had maintained that students would not "automatically" write good notes, and that students had to learn to write good notes through constant practice. Charity had explained that she was worried about several points regarding student-made notes. For instance, she wanted to know:

1. How long would it take before students learned to take good notes?
2. How would she know when they had learned to write good notes?
3. Where would she get the time to teach the content and then give students time to write their own notes during the very limited time given to biology.
4. What should she do with students who failed to write good notes within a reasonable length of time?
5. What was a reasonable amount of time in which to decide that students had or had not learned to make their own notes?
6. How would she be sure that students had composed the notes themselves and had not just copied them from a textbook?

There was no shortage of answers to all these questions from Charity's colleagues. Everything was made to appear very simple, after all, the other three teachers had anectodal examples galore, collected over their long teaching experiences. Teachers emphasized that given the chance, students can and do learn to take excellent lesson notes. Charity finally, but somewhat hesitantly, agreed that she would get her students to learn to make their own notes. During the third term of first form in 1983, she implemented the new technique. The instructional initiative consisted of three main elements. First, during lecturing, Charity would put the main headings of concepts on the blackboard and consecutively add the sub-concepts that followed. Second, she would allow students to write their notes on the concepts and subconcepts and on whatever else they thought they needed. Charity would make frequent pauses designed to give students plenty of time for note writing. Third, Charity had evolved a system where she would give a list of short questions either as she lectured or more often, at the end of each lecture block. These questions, designed to consolidate and extend classroom lecture notes, would be written at the back of notebooks, and students were expected to answer them as homework or assignment after each lesson.

By the end of third term of 1983, Charity had almost ceased dictating any type of notes to students except for questions. However, at the beginning of 1984, Charity was observed to have become visibly uncomfortable with the student notes-writing system. Asked whether or not the new system had worked well, Charity had explained that her Form 1 class, although not with the lowest scores in biology in the school, had not performed as well as several other streams. The biology test that had been given to all 6 streams at the end of1983 had been a recall test and Charity's students had not done well.

During the following seminar, teachers discussed Charity's concern, namely, that because she had given more of the teaching time to students in order for them to make notes, she had been unable to cover properly, the same amount of detail in the assigned topics as that covered by students in the other five streams taught by other teachers. Charity had then stated that she wanted to reduce the time devoted to student note writing. The other teachers offered encouragement explaining that persistence was the key to success. Lloyd offered to bring, and brought to the next seminar, a series of notebooks kept by one of his students from first to fourth form. He maintained that looking at these notes, would enable Charity to "see" that every student started by taking notes rather poorly but that with practice, improvement was inevitable. But Charity was not really convinced that her own students would ultimately succeed and she kept on insisting that she had to cut down on the time for note writing since she had to cover the syllabus.

In actual fact, the main problem to Charity's new instructional technique did not lie in not covering the syllabus, but rather, in the fact that Charity's notes-taking system which she had so carefully implemented, lacked two necessary elements, namely: teacher's constant checkup on the accuracy of student made notes, particularly their definitions of technical terms many of which formed the bulk of the examination questions; and marking of student notes by the teacher, at least, at the beginning of student attempts. It was not a practice in Charity's school to mark student notes regularly. After all, if the teacher had dictated the notes, they were sure to be correct. Charity had not realized that she could not continue with this system as long as she required students to take their own notes. Therefore, the only student record of what they had learned consisted of what they had understood, which unfortunately, was not always quite accurate.

During the weeks that followed the above seminar, Charity had maintained her student notes-writing system, but she could still not seriously correct student notes. Two teachers had been transferred from the biology department, creating a heavier teaching load for Charity consisting of 32 periods a week. The last straw on Charity's increasingly strained program, came a week later, when the results for the annual public 'O' level examinations results for 1983 were returned to schools. During assembly throughout that week, the school head had taken all teachers to task, claiming that they were not working hard anough. Singling out biology (and three other subjects) as one of the subjects performed poorly by students, the head had commented, "In a simple subject like biology, everyone ought to pass." The head had then ordered all teachers to GIVE notes so that students would be able to revise from accuurate class work after school.

Charity had immediately reverted to her old system of dictating notes. However she did not abandon entirely the new system she had installed. She continued to give more time to write out experimental work and gave more and more questions to be done as assignments. Charity also realized that marking student notes was important and she instituted a strategy of marking books and monitoring the completion of all assignments during class time. But several forces later combined to make this arrangement almost counter-productive. For instance, on several occasions during assembly, teachers were denigrated by the school head for apparently, not giving students "good notes". This public censorship made it very difficult for teachers to control discipline in class. More significantly, some students began to pay less attention to their out-of-class assignments since they expected teachers to give them notes. The more pressure the head put on teachers to perform better and work harder, the less effort Charity put into ascertaining that students actually understood their own responsibilities in the learning process. Charity, therefore, discovered that more and more assignments were ignored or incomplete. This led to more public counselling and monitoring of student work during class time, which in turn, reduced substantially the time for teaching and learning. In the end, when I asked Charity why she had reverted to dictating notes she said:

> "My class would have been the only one with nothing to read and revise for the examinations. I was the only one not dictating notes. Moreover, if you look at the notes students have copied in dictation, they have many mistakes. Imagine what would happen if all the notes were made by them."

Asked whether or not giving and dictating notes would, alone, improve student achievement, since it did not seem to have had much effect in the last 5 years in the school during which it had been practiced, Charity replied: "I don't believe it will improve passing. But then that's not the point. The point is that I don't want anyone to say I did not give notes."

Charity had of course, not very systematically thought through the implementation of her new instructional techniques, but she was initially prepared to make changes as new insights arose. However, what ultimately led her to abandon the new changes was not simply the school head's directive on giving notes, but also the isolation she felt in implementing the innovation alone in the school. This isolation was particularly important for purposes of accountability. Her colleagues and advisers on change were working in different schools, and Charity could not call upon them to defend her instructional strategy in her working environment.

Stability of Instructional Change

Stability can be defined at two levels, namely, stability of implemented instructional change across classrooms taught by a particular teacher and stability within the research class, vertically through forms 1 to 3. In the first instance, Dalia and Charity's examples have shown that the very process of implementation of change is itself fraught with problems. Reflecting on the totality of the experience, change in individual classrooms did not appear to become very stable unless the teacher had beforehand, isolated some school-wide factors that were likely to affect classroom changes. Taking into account such factors and setting up mechanisms in order to reduce the impact of such factors on individual teacher efforts also appeared to minimize conflict between individual classroom instructional changes and school-wide attitudes, beliefs and prescribed practices. But Charity's case demonstrated that even where an implemented change was 'dropped' to revert to the original technique, important remnants of the new instructional technique were incorporated into the old system, so that stability of some elements of the new changes was observed up to the end of the project, even though the major instructional change had been abandoned.

In Lloyd's case, it was clear that attitudes, beliefs and practices in the school presented little or no problem to the implementation of changes that Lloyd instituted. In fact, the major initial obstacle to the success of the implemented instructional change was due to Lloyd's decision to "go all the way" with an instructional change that he thought concerned only a few students in the class and not the whole class. What finally evolved, after several trials and correctives, was a more balanced system of monitoring the practical work of students which remained operative up to the end of this research project. In Lydia's case, since all the implemented techniques were, to a large extent, already part of the overall instructional strategy, school-wide policies and practices did not appear to have presented any problems during implementation. Lydia continued to use the refined techniques up to the end of the observation period.

On the second aspect of stability, Lloyd was the only teacher consistently observed teaching classes at levels different from the research class. He was observed teaching at forms 3, 4 and 6 during 1984. In form 1, 2 and 3, Lloyd appeared to use more or less the same instructional strategy that he had been observed using in the research class, which was then at Form 2 level. It was observed that Lloyd had transferred his new monitoring technique in the conduct of practical across form levels. In forms 4 and 6, Lloyd's instuctional strategy appeared to be different in the sense that students seemed to have more opportunity to discuss concepts and challenge Lloyd on various issues. But even here, Lloyd seemed easily to maintain his usual authority, allowing alternative interpretartions of points of contention to emerge but only as long as they were either correct or reasonable alternatives. In any case, Lloyd always had the last word.

In general however, it would have been exceptional in this study if the real new changes had all been sustained over much longer periods than those indicated in the cases of Charity and Dalia. There appears to be evidence that the present structural and social organization of schools make it extremely difficult for teachers to sustain change. For instance, Ireland and Russell (1978) during the Ottawa Valley Teaching Project, worked with a group of teachers who were interested in "affective and higher-order cognitive objectives and used reflection-in-action strategies to discuss their work and techniques of implementing change. Similarly, Elliott (1977) worked with a group of 40 teachers in the Ford Teaching Project in England (1973-1974) all of whom had expressed some commitment to attempt to implement the "inquiry/discovery" teaching approach in their classrooms. Russell (1983) reports that in both groups, virtually all participants seemed to value the increased self-awareness they achieved, and that teachers found much in common as they talked to each other about what they saw in their own practices. However, only a small fraction was able to sustain major modifications in their teaching. Russell concludes that, "self-monitoring is difficult to initiate and continue within the contexts of our present schools." Collaboration among teachers within the same school would therefore, seem to be a prerequisite if major modifications in teaching are to be sustained.

Chapter 5

TEACHERS AS RESEARCHERS

A good education, be that of
pupils at school or university or
even for older teachers like
ourselves, does not come easily
or cheaply. Lydia (1985)

Teachers Meet Colleagues as Researchers

The four teachers who participated in the research project undertook to study various aspects of the Kenya educational system during the second year of the project (October 1983 - October 1984). This was not a research project in the strict sense. The activity simply consisted of gathering and discussing information on areas concerning dynamics of the educational system. Throughout the year, individual teachers and myself discussed what teachers were finding out. During a seminar in late 1984, teachers agreed that their findings would be presented to a larger meeting of their colleagues for further discussion.

The meeting which was held on Saturday, May 18, 1985 was attended by 18 male and 14 female teachers from 19 different schools from Nairobi, Kiambu. Thika, Meru and Nakuru. Only one teacher, a man, had had 1 year of teaching experience. Of the remaining 31 teachers, 11 had taught between 2-5 years, and 21 between 6-14 years, respectively. Of this latter group, 10 teachers had taught at least 8 years. Half of the teachers present were teaching at all levels of secondary school and in this group, there was one school head and 14 heads of departments of biology.

Because of the nature of issues that were to be discussed, teachers had purposely decided not to invite personnel from the Ministry of

Education and its various organs. Teachers had feared that the presence of "official" personnel would influence the quality of self-expression of individual opinion among participants. Teachers were aware that the very nature of the duties that are performed by these officers, restricted their discussion of some issues and often demanded that those who performed such duties defend their "official" actions.

As it turned out, teacher fears had been justified. For instance, they had invited an officer who had previously been a participant in the research project but who now worked for the Kenya National Examination Council. During the seminar many issues concerning examinations were raised and discussed. But teachers were disappointed when the officer could not answer many of their questions which involved his job, leaving some teacher with the impression that he had changed from the ordinary teacher some of them knew, to an officer "with secrets to protect".

My introductory remarks clarified three issues, namely, who was holding the meeting; the purpose of the meeting; and the expected role of the participants. Teachers in the research project had pointed out earlier that in a meeting of this nature, introductions were very important, particularly, when it came to establishing the legitimacy of each participant present. One could almost see the sense of excitement as teachers craned to see teachers from various schools. I explained the purpose of the meeting and introduced the four teachers who had participated in the research and gave a brief sketch of the project. I emphasized that teachers and their guests were in the meeting to exchange ideas issues on which teachers had been gathering data for the past 2 years.

Dalia made the first presentation on the topic **"The Effects of Having Long-term Classroom Observers"**. Dalia gave a personal testimony of her own feelings and reactions to the "ever present observers" in her classroom during the past 2.5 years of her teaching experience. She described how her feelings and reactions had undergone four stages. First, she had tried to please the observers, but she had become very tired because of the pressure which this had put on her daily. Second, she had become fed up with the observers so that she had decided not to care whether they were there or not. Third, she had started caring again and had attempted to improve her instructional strategies. Finally, she had settled down to doing what she thought was best for her class regardless of the presence of observers. Dalia described her initial reaction to observer presence as one characterized by a vacillation between "preparing" herself for the observer, and letting the observer "take me as she found me". She stressed that through the period of observation, she had reached three conclusions.

1. No teacher or researcher should expect teaching to be normal when there are observers or gadgets such as tape and video recorders, because regardless of how long the observers or gadgets stay in the classroom, they cannot become part of the class, from the observed teacher's perspective.
2. No improvement in teaching can be initiated until the teacher has gone through the vacillation period on one hand, trying to do what the observers expected, and on the other hand, doing what the teacher thinks is correct regardless of the observer expectations.
3. It takes students in the observed class even longer than the teacher to get used to the presence of observers and gadgets.

Dalia described her student reactions to long-term classroom observers and video taping this way:

> "At first they [students] were not terribly worried. They had seen other observers in other classes in primary school. But their actions in class were not normal. They did not behave normally. Their general response was negative. They were afraid of putting up hands, just in case they said the wrong thing. You see, at first they thought the observer was evaluating me. I had forgotten to introduce the observers properly. After the observers came a third time, they really started wondering why these persons were coming to my classes. They were frightened and they panicked. They were afraid to ask me just in case I was the one in trouble. The breakthrough came one time after a researcher had observed a lesson and we stood outside and had a humorous discussion for about 20 minutes. The students were watching us laugh. They figured all cannot be bad if we were laughing. After that they asked me why the observers were coming and why to their class. Then I explained. Later on the students got instruments to fill in and they found they liked these instruments and this eased their

> minds. Much more important we arranged so that the students could see some of the video tapes. This first happened one Saturday morning, and they talked about the tape, what they had seen, and how they appeared for more than two weeks afterwards. After the video, they were really interested. They got more or less used to but were still fascinated by the equipment. They even improved and became very conscientious and I could sometimes see that they liked to act for the camera."

As to Dalia's own reactions to the long-term observation and video taping she said:

> "Well it really demanded a lot. You had to be well prepared all the time. You had to project an image of a good teacher. But the video taping was something else. At first, I was worried. I did not know how I was going to look. I was not sure who else was going to see my tape. Therefore, I think I always taught badly on video tape until I saw myself. When we saw the video tapes - fortunately we started with other teachers - so I was not the first, then I saw that no one was really trying to find faults with any particular teacher. It was just learning. In education we make so many mistakes because we are not researching enough. After you see yourself on video and you count your errors - then you decide to do something about it."

Dalia was bombarded with questions regarding the feelings she had expressed. Teachers wanted to know particularly, whether or not Dalia thought that the observers tended to create "disturbance" by over-vigilant rotating of cameras in an attempt to capture scenes from the whole class. Teachers also wanted to know whether or not other teachers in seminars, did not tend to give unfair criticisms, in view of the different school abilities to provide sufficient teaching-learning resources. But Dalia, calling on support from her seminar co-participants, emphasized the fact that even though all these problems had been there, they had not been major. Dalia stated that if she had to go through the same experience again, she would pay more attention and devote more time to the seminar discussion and interviews with the researchers since they were the most useful aspects of the research. Dalia pointed out that classroom observation and viewing and discussion of video tapes took a lot of time so that as a teacher she sacrificed so much of her time to the project. Dalia pointed out that there was need to work out a system whereby if a teacher was participating in this sort of research, there would be some official recognition of the teacher role in the school so that the teacher does not become overburdened with work and thus, becomes disillusioned with the research.

Complementing Dalia's description of the general feelings teachers had regarding the presence of longterm observers in the classroom, Charity had stated:

> "When you work every day in your own school 5 or 6 years, you only talk to teachers in your school. When there is something wrong in the school, you all tend to believe that it is only in your school. And when you hear something good about another school, you imagine that only good things exist there. What I learned through discussion with teachers from other schools was real. It was not the rumours. I found out that all schools have problems - many of them the same problems. Also that all schools have something they are doing very well. The difference is the way they do it-the way they choose. I think this is what really makes a difference."

In the second presentation Lydia talked of an issue of wider concern in the total educational system namely, **"Do Biology Public Examinations Match the Content of Classroom Teaching?"** Lydia introduced her presentation by telling teachers that she had been fascinated by this issue by being involved in three different experiences. First, marking of public examinations had introduced her to differing points of view on the issue by markers of examinations. Second, participating in research had enabled her to take part in numerous discussions on interpreting the syllabus, teaching for public examinations, as well as problems of teaching at the "right depth". Third, matching her classroom teaching to some external examination had always presented a great challenge. After discussing the problem from these three points of view, and stating the advantages and disadvantages of each position, Lydia said:

> "The issue is controversial. Because if you say, I am going to teach as I wish, with no regard to the existence of examinations, then I think you will have a problem. On the other hand, the examinations, I think, are not set on what is actually taught in the classroom but on what is in the syllabus. Generally, I would say that the examination should try to match classroom teaching but there are two main problems. First, who actually knows what has been taught? And second, what is the proper matching?"

Lydia explained that, by and large, public examination questions reflected what was in the syllabus - "topicwise". But it was not uncommon to find public examination questions which tested what was not expected either at the depth of teaching at the school level from the reality of the physical circumstances of many schools. Lydia quoted examples of public examinations where sometimes questions requiring university level knowledge had been set for A level candidates. Lydia's presentation was followed by a long and lively discussion where the gist of teacher opinions consisted of the following points:

1. There was little co-ordination between curriculum developers, subject inspectors -who should assess the depth at which various topics are taught and what has actually been covered during teaching.

2. Many teachers, in interpreting the syllabus, only look at the content being unaware that public examinations are more concerned with the coverage of objectives rather than individual topics.

3. Many teachers had difficulty dealing with social objectives while teaching subjects such as biology, chemistry and physics. The curriculum developers should spell out more clearly how such objectives can be handled and operationized in the classroom.

In summarizing the discussion Lydia emphasized: " an examination should not be an exact match to classroom teaching. The examination should be beyond teaching. Students should be able to use their heads to answer a question even if something was not specifically taught." Asked to explain in what way participation in research had helped her to improve her teaching, Lydia had stated:

> At first, I thought I knew a lot about teaching and education in general, since I am lucky to be working in a good school. I thought that since the students have been passing their examinations very well, that we were educating them properly in everything. But through interviews and discussion, I came to realize that we all have a long way to go, in all schools. You see, in classes, we are not really that efficient. Learning and teaching could be better. We assume that when students are sitting in a biology lab, that they are only learning biology. By looking at the video tapes I was able to see that my students, just as in other schools, were learning and doing things that I had not intended. I came to realize that many of the discipline problems in class are the result of what students have learned about a teacher's behaviour. No

> teacher is able to notice this sort of thing until other teachers point it out to you. But it is also important to have a researcher who will help all teachers to see various points of view. I think as teachers we tend to see only what we think is good or bad. We do not look in between. And that is the real source of our problems.

Lloyd's presentation was on the topic: **Where Should Emphasis be in Training Biology Teachers: Experiences from Research and Teaching**. Lloyd began the discussion by asserting that since almost everyone in society felt himself competent to comment on and criticize teachers, it had come to sound as if everyone could play the role of a good teacher. Lloyd pointed out that knowledge of specific subject content was only part of a teacher's role, and that the other aspect of a teacher's role consisted of a social dimension, dictating a coherent pattern of behaviour. Each teacher had both an ascribed and an achieved role. The former involved duties such as; class-teacher, a games teacher, a deputy head of school; while the latter depended more on a teacher's ascribed status, but without considering where and how the teacher worked at his other roles. Lloyd argued that in addition to the ascribed roles, the teacher must also develop definitions of himself with regard to his job and status: "what does he think of himself? Is he a teacher only? Or is he also a member of society, a member of local pub, a member of a footbal club and so on?"

Lloyd pointed out that participating in the seminar discussion had helped him to begin to constantly examine such issues and to see in what ways his answers were likely to affect the way he taught. Lloyd said that while over the years, teachers had come to gauge their expectations of other teachers by more realistic standards, society in general, had evolved expectations that were far from reality. Thus a teacher was expected to be considerate, disciplined and orderly. He was expected not to fight in public, not to drink and not to complain about poor pay. There was need however, to look at the teacher roles by asking whether or not there was something special about a teacher's work which dictated that he should reach such high levels of morality which other ordinary persons in society are not expected to reach. Emphasizing the need for teachers to discuss such issues, Lloyd asserted, "many of us don't know who we are any more."

Addressing himself to the nature of teacher training, Lloyd wondered whether, in view of the various expectations for teachers as very special people, society was training teachers to meet these high expectations. Lloyd asserted that it had become obvious that recent graduates "were packed up" with knowledge but lacked professional ethics: "they regard teaching just like digging. They can walk into a school with a checkered cap or a skewed scarf on the head, a trouser with the bottom hems trailing 40 inches below the ankles, no jacket, front buttons on the shirt open to the waist, chewing *miraa* or cigarettes, and expect to teach properly academics and morality." Lloyd asserted that the teacher training colleges were doing a very good job in the "knowledge sector", but that they were not doing enough in preparing teachers in the important area of professional ethics. Several issues were raised during discussion regarding teacher training, certification, promotion and professional growth after certification with emphasis on the following points.

1. There was need to give the teacher trainee sufficient exposure to real classroom life before he went out for teaching practice and final evaluation in order to obtain certification.

2. A single teaching practice was not sufficient to help the trainee to appreciate the complexities of different classrooms and students in different school situations.

3. Teaching practice placed too much emphasis on policing trainees, assessing and awarding grades, passing an examination, and identifying weaknesses but rarely helped him to improve and grow and consolidate his strengths.

4. The need for, and meaning of the probation period for a newly qualified teacher was no longer clear. Similarly, it was neither clear if the head of school still wrote probation letters to the inspectorate regarding the new teachers' perfomance, nor if inspectors still took part in the training and certification of teachers.

5. The teaching profession was still plagued by the twin problems of recruiting entrants from the bottom of the achievement ladder; and

providing a stepping stone to other jobs. This was because secondary school teaching did not seem to require competent professionals since the pay was low, and the prospects for promotion and upgrading were almost non-existent.

6. The social expectations for teachers were superhuman. While the teacher should be a model, with only don'ts as the code behaviour, he was publicly despised due to the meagre income accruing to his job.

7. Society should not expect good teaching simply because a trainee has got a first class certificate from college. For a teacher to become good and remain so, demanded systematic professional help and rewards comensurate to the effort and adaptation that teachers have to put in whenever the educational system and school curriculums change.

The last presentation on the topic: **"The Contribution of Parents and Community to Poor Learning by Pupils"**, was given by Charity. Charity's basic contention was that many parents had not yet realized that for the majority of primary school children, and day secondary school students, useful classroom learning should be supported by proper social learning at home. Charity pointed out that many parents did not take seriously their role as teachers once the children start school. She said that the pressure on mothers to put in standard working hours in the urban sector, meant that very young children were left in the hands of young or inept housegirls, who had too many duties in the house to pay attention to the child. Where the mother did not work, the family tended to have many children who kept the mother too busy and exhausted to educate them properly. As a result, diets were poor, money was always scarce and living quarters crowded so that fighting between parents and among children was frequent.

Charity explained that a sizeable proportion of secondary school students attending day schools in Nairobi either lived in single parent families or were staying with relatives because their parents were in the rural areas. Many of these students, especially girls, were overworked at weekends; they often woke up extremely early in the morning to make breakfast for the family; and after riding on very crowded public service vehicles, arrived at school harassed, tired and in no mood to do serious academic learning. Charity stated that many students were too busy doing home chores to complete assignments at home and that their parents, relatives and guardians neither bothered to remind students of the need to complete homework nor motivated them to do any reading. The same students, Charity added, concentrated very little in class, were subject to constant disciplinary punishments in school for lateness and inattentiveness in class and submission of incomplete assignments. Charity stated that students in day urban secondary schools often suffered a triple disadvantage due to the location of both their homes and the school.

> "Many low income homes within the city radius are overcrowded, with few amenities, poor parental support and are often situated in areas where the brewing of illicit drinks, and other illegal or anti-social activities are in general practice. It is often the case that a student living under these conditions will go to a school which is itself sandwiched between busy highways with the honking of taxi-horns as a perpertual disruption. The same school may be near 24 hours-open cinema houses, kiosks or discos to which students are tempted to sneak during class time. These schools in 'no-man's land' to which these students go have therefore, no tangible community support. The surrounding community to the school is often too diffuse and mobile to be bothered about school. The parents are often too busy making a living, to pay attention to requests initiated by school for support, be it moral or financial".

Charity stated that participating in the seminars had helped her to see different ways of interpreting these factors and conditions.

> "We were always encouraged to see the other side of the coin. And I think that is where teacher discussion really helps. Before I took part in the seminars, I knew about most of these factors and conditions. I always thought that the people caught up in them were mostly responsible. Now I can see that there are many other factors involved."

The discussion that followed reiterated the same problems emphasizing five points.

1. The majority of parents - not just the poor, the rural or those who have had no formal education, had not realized that not everything can be taught in school, and that parents needed to keep in touch with schools in order to find out what they can teach their secondary school children.

2. A large proportion of parents in the urban areas were overburdening their teenage children with too much housework leaving them very little time to study and complete school assignments. However, some parents, especially the well-to-do, were giving too much play time to their children, treating them like breakable objects, instead of teaching them to do some chores and the value of manual work.

3. A small proportion of parents had a genuine desire to help their children with school work or school related activities but they lacked the knowledge. The P.T.A. meetings had increasingly become political meetings, often concentrating on only how to collect *Harambee* funds instead of seriously discussing classroom work and how such work can be improved through community and parental support.

4. Teachers working in urban schools were subject to the same temptations of neglecting their duties just like other civil servants. Several factors were often in play. For instance, decent housing was difficult to obtain. Yet the allowances given were too small. Under these circumstances the only way a teacher could afford a decent house, in a reasonable neighbourhood was to run a business during teaching hours.

5. The recent trend to build student hostels and dormitories for schools in urban areas was an extremely useful step in overcoming some of these problems. But this step by itself would not raise the standard of academic achievement in urban schools unless other problems of urban schools, such as neglected management, teacher welfare, school facilities, learning resources, and urban planning, were simultaneously considered.

Teacher Development

A summary of these four presentations has been documented for three main purposes. First, each of these presentations dealt with an issue of informal research which each of the four teachers had chosen to study during the second year of the project. These were areas the teachers identified themselves. The purpose was not to teach or train teachers to do research. Rather, the purpose was to get teachers to pursue a problem or an issue consistently throughout the project so that they could see its broader implication in their own work and the wider educational system. And as has been shown, each of the issues investigated and discussed at the seminar was of great interest to all teachers. And the fact that none of the problems raised on each of the issue was resolved, suggests that all these issues continue to be of great interest to school personnel in general.

Second, the four presentations throw some light on the confidence with which teachers in the project had come to present and argue their points of view. To me it was a source of immense satisfaction to see how the research project teachers, when confronted with polarized questions from other teachers, attempted to evolve a balanced point of view. This was of course, something we had painstakingly strived to achieve during interviews and seminar discussions. It appeared to me that the ability of teachers to feel and act confidently brings with it not only the capacity to synthesize information from different sources and to weigh its merits and demerits, but also the ability to do what Lloyd once described as "reflecting at both ends of the scale". This realistic view of issues, problems, solutions, and strategies characterized the research teacher presentations and discussions. It is quite true that its roots were obviously, in the minds of teachers before the start of the research project, but as the teachers themselves pointed out, the interviews, the discussions and interactions with other teachers contributed to its growth and greater expression.

With regard to teachers who attended the meeting but who had not participated in the research project, there was initially "silence" as they sized up each other. Fortunately, this happened during most of my own presentation of the introductory remarks. But once the ball got rolling, the problem was really one of time. Teachers literally poured out questions, criticisms, comments, explanations, defence and demands. But the meeting was not always smooth. For instance, during the discussion that followed Charity's presentation on Parents Contribution to Poor Learning, a male teacher had pointed out that mothers with large families tended to be cruel to their children. A female teacher disagreed vehemently. A second male teacher drew the meeting's attention to an article that had appeared in a local newspaper the previous day entitled *Women Criminals*. Several female teachers wanted to talk at the same time, explaining that these criminal activities were exaggerated and that women became criminals only after mistreatment by men. A male teacher shouted that young men mistreated their wives as a result of men's earlier mistreatment by their mothers. A female teacher disagreed, stating that in her experience, mothers mistreated their daughters more than their sons and in fact often spoiled their sons. Some female teachers insisted that it was fathers who always abandoned their children who then became *parking boys* loitering the streets. The male teachers pointed out that it was mothers who failed to educate their sons as "fathers" in the first instance.

There were these minor confrontations and emotional outbursts, and defenses of the sexes, jobs, roles and status. The Ministry of Education and its various organs also came under attack on many points of our discussion. And since these organs were not represented, they provided an easy target for the pent up feelings of teachers. But what all these various degrees of emotional and intellectual commentaries underscored was the need to have frequent meetings of this nature to enable teachers to get a few things off their chests. The whole record of discussions during seminars, right from the beginning of research project to this larger meeting, clearly showed that teachers need to learn first, to manage their emotional feelings of professional vulnability and defensiveness in order to use their wealth of intellectual and practical experience for constructive intellectual discussion, reflection and instructional change.

Teachers suggested that there was need to set up communication channels between various organs of the Ministry of Education and teachers in order to improve the teaching-learning process. Teachers were generally unhappy with present methods of communication by circulars, some of which they said rarely, reached them. Teachers said that they wanted to have a say in curriculum development, examination setting, teacher training and the certification of teachers. They also wanted the broader society to take a more realistic view of both the possible and potential work that schools and teachers can do in educating children as well as what parents should do in order to take a more active role in educating their children in their own homes.

Many teachers stated that they were aware that they were not doing the job of teaching well enough and to their satisfaction. While many teachers were willing at first, to quote a catalogue of "external" factors that prevented them from performing their jobs to their maximum best, many later admitted that they themselves and other people such as researchers, the university teachers, the ministry officials, the parents and indeed the schools were not doing as a good a job as could be expected as a result of "internal" or personal factors. It became clear that many teachers detested pontification from above, some felt that they and their schools had become guinea pigs, but the majority were genuinely looking for help in the field. The main question that was left unanswered at the end of the seminar was: how do we help the teacher without robbing him of his experience and status?

A Look to the Future

Many of the teachers in the seminar and in the four schools who participated in the research were interested in improving their work. Practicing teachers comprise a large educational community which should increasingly make a greater input into educational research. The stage should ultimately be reached where teacher involvement in classroom and school research should be the accepted norm. The major problem, therefore, is to find suitable strategies that teachers can use to take on new tasks beyond their already over crowded schedules. While the intellectual benefits such as: developing new insights about practice, merging theory into practice, sharing an "internal bank of data and classroom practices", increasing teaching effectiveness, and accessbility to colleagial discussion and interaction; all of which teachers are likely to gain from involvement in research are undisputed, there is considerable argument with regard to the wider issues of professional growth and financial compensation. As Shallaway et al. (1978) have noted, financial compensation is necessary, but " compensation must also come in the form of increased opportunities and outlets for the professional experience and knowledge gained as a result." Plans of strategies to ensure that professional growth does not terminate at the end of a teacher collaboration and involvement in a particular research project, should be part of the initial teacher considerations for involvement.

Through this research and from general experience, it is apparent that a single formula will not work for all schools and teachers for several reasons. Looking at only the four schools in this research, it was evident that teachers saw the needed improvement in their instructional techniques as concerning different factors, although, for all of them the ultimate goal was to get 100% achievement for all of their students. For instance, Lydia at National stated that a major improvement needed in her school was to synchronize the interpretation of the syllabus across class levels. She was satisfied with the general management of the school and student discipline. Lydia was quite convinced that, at least, in biology, if teachers taught at a reasonably synchronized level in all streams, the grades would improve uniformaly among students in the school.

At Provincial, Lloyd believed that improvement was needed by way of implementing a reduction in the amount of duties for some teachers in order to free these teachers to do more remedial work with individual students. Discipline and general school management was already good, although Lloyd felt that there should be some improvements in overall school organisation to enable more flexibility for teachers and students.

At District, Dalia saw improvement as needed in areas such as co-ordination of work by teachers, building teacher commitment to the school and to their work, strengthening the administration through proper duty delegation, and carrying out remedial work with students. Generally, Dalia was satisfied with student discipline and believed that a general improvement in school management would improve academic achievement which would, in turn, be a stimulant to better discipline.

At Urbana, Charity felt that school management had to be improved in order to tackle the major problems of student discipline and teacher commitment to their work. Charity believed that without first solving these three problems, there would be little improvement in student achievement. It is obvious then that if the suggestions of the four teachers were to be considered, each of the four schools would have to do different things in order to improve just one area, academic achievement.

But underlying all these different 'problems' and as an initial technique in order to find out the universality of these problems, is the fundamental requirement for discussion in schools. As a general strategy, teachers suggested that all school personnel should become more open to discussion about working out solutions to their problems than is currently the case. Experience from these four different schools clearly illustrated that, while there was room for meetings that bring together people from different schools or even different institutions, such meetings were unlikely to be very useful when it came to discussions, solving problems and devising ways to implement changes and innovations within particular schools. We saw earlier how Charity's implementation of an innovation suggested to her by teachers from other schools was plagued by problems because its implementation was done in isolation of her school's basic beliefs and practices - beliefs and practices that did not exist in the schools from which the teachers who had suggested the changes worked. Furthermore, professional teacher development should as much as possible avoid using strategies of 'mass mobilization' that attempt to "convert" all teachers to either use of a particular teaching methodology in a new syllabus or adoption of a research finding. As has earlier been discussed, mass conversion training techniques do not appear to work probably because as Fenstermacher (1978) has pointed out, they overlook the beliefs that a teacher already holds with respect to an aspect of teaching practice to which new methods or research findings are relevant. Russell (1983) points out that given an alternative, people would rather undergo transformation than conversion so that personal reflection on one's own professional actions, appears to have considerable significance within approaches that attempt to foster transformation. Ultimately, each school should 'rear' its own group of promoters of change. Each school should create an organizational infrastructure in order to identify the structural and social-cultural beliefs pertaining to various practices so that when different subject departments seek to implement changes -instructional, financial, resource sharing, linguistic, organizational and structural factors- the whole school is ready to adapt within the necessary framework as perceived by a significant proportion of school personnel.

We identified the following factors as prerequisites for a system that promotes innovation and change within individual schools:

1. Every school should begin to consider its own personnel, including students and some non-teaching personnel as the 'right' people to assist in the identification and solution of problems. The hidden talent and potentialities of all school personnel which are at present ignored, in preference to those possessed by 'outsiders' must be sought, harnessed and used.

2. Every school should begin to view its potentialities in academic achievement as limited and curtailed not so much by the amount of human intellect possessed by its students and teachers but by the ideology, beliefs, and practices of its administrators, managers and teachers, in relationship to the nature of the teaching-learning process, and the traditions of the school, both of which are the result of social conditions existing in particular schools at particular points in time.

3. Every school should begin to view the potentialities of its students in academic achievement as ammenable to expansion through pedagogical and management considerations. Improvement in student academic performance must be tackled through an integration of knowledge on organization and use of time, understanding the social purposes of education and schools and the value of positive attitudes and beliefs in the processes of changing personnel and institutional behaviour.

4. Every school must begin to view itself as a learning place not just for students but for all who live and work in it as well as for all who come in contact with it. While the learning processes in classrooms would continue to be dependent on pedagogical innovations initiated by individual teachers, learning throughout the school should be increasingly characterized by a very strong dimension of analysis of purposes, practices and the continual evolution and conceptualization of alternative ways of doing things.

5. Every school should set up "outside" of classroom instruction, a learning mechanism that: (a) identifies the specific needs, aspirations

> and achievement of various groups in the school; (b) designs techniques for strengthening effective strategies in all spheres of school life; (c) designs techniques for the reward of small daily victories in all areas of school life, and strengthens the link of these victories to the ultimate purpose of education; (d) undertakes to continually search for concrete solutions to old and new problems; (e) devises a system of harnessing the potential of all school personnel and organizes the flow of information within the school; (f) designs a system of harnessing immediate environmental resources and talents which are untapped in both the academic and social development sectors; and, (g) devises a system that eliminates language and communication barriers within and outside the school, reduces social deprivation and renders each school open to new experiences.

To date, the so called "good" schools already possess many of the elements listed above. However, the potential of these elements to benefit all school personnel and lead to total growth, academically, professionally and socially, by all those who live, study and work in such schools is curtailed by at least, three factors:

1. The elements are couched in a language and implemented through practices that deliberately indicate that they are for the sole purpose of controlling or containing students and teachers.

2. The elements are implemented within an infrastructural and management framework that emphasizes the fact that the quality of knowledge is unidirectional and is linked to status.

3. The elements are operationized within situations that separate the processes of teaching from those of learning and thus emphasize and reward only limited forms of learning.

These three points imply that to date, no school is already above learning. The 'good' school which has already achieved high performance on public examinations, has as much learning to do as the poorest achieving school. Incorporating discussion in individual schools or among a group of schools will entail its own problems. For instance, teachers who participated in this research and those who participated in the last 2 seminars suggested that something had to be "mandated" so as to bring about communication within and among schools. Associations of teachers were suggested, a journal for teachers was recommended, a newsletter of innovative teaching, seminars, meeting, fairs, and exhibitions were identified as possible mechanisms. None of these mechanisms or activities falls outside the 5 pre-requisite factors that I have outlined above. What is required is to rethink the whole purpose of communication because the unanswered question remained: who will begin the process of change?

And here might lie the opportunity for teacher training to rethink their own strategies and methodologies. Kaplan (1976) in a rebuttal to half-hearted attempts to equate teacher participation in research as equivalent to change, has cautioned that "without the tools to question our own behaviour, there is little hope for improvement" (p. 68). The question which arises is: are teacher education programs providing their graduates with the tools in order for teachers to take part in classroom research and analyze their own instructional behaviors? Teacher training programs do not normally include consideration of teachers as researchers. More significantly, the current debate on democratic schooling suggests that teachers must learn right from pre-service training to become what Giroux (1986) and Aronowitz and Giroux (1985) have called transformative intellectuals, i.e, "one who excercises forms of intellectual and pedagogical practice which attempt to insert teaching and learning directly into the political sphere by arguing that schooling represents both a struggle for meaning and a struggle over power relations" (p. 215). Aronowitz and Giroux also characterize tansformative intellectuals as capable of analyzing various interests and contradictions within society and articulating emancipatory possibilities, and working towards their realization.

In describing the contribution of current teacher training programs to the development of transformative intellectuals, Giroux explains that "when classroom life is discussed during college courses, it is presented as a one-dimensional set of rules and regulative practices, rather than as a cultural terrain where a variety of interests and practices collide in a constant and often choatic struggle for domination. Unfortunately, this concept of schooling vastly contradicts what the student teacher often experiences during his practicum". Giroux asserts that many programs do not train teachers who can conceive their work as intellectual labour;

instead, teachers become technicians or public servants whose role is to implement rather than to conceptualize pedagogical practice. Against this background, teachers form and fortify their own one-dimensional ideologies and experiences, there being no grounds upon which to question the dominant beliefs that shape the way in which they respond to, and influence student behaviors. It would seem therefore, that new learning should not be restricted to schools.

Perhaps even more urgent than in schools, learning is needed in teacher training institutions and policymaking organs. The same learning prescribed for schools should be done by colleges and departments in colleges that train teachers. If supervisors and researchers from these institutions are going to work with and learn from schools and classroom teachers, then they ought to be conversant with the lessons that schools and teachers have to teach. Furthermore, the teacher education programs must build more effective knowledge bases about teaching during teacher training. As Lanier and Floden (1978) and Lanier and Little (1986) have pointed out, little is known about transmitting the research knowledge in ways that allow teachers to successfully modify their practices. Without research in the methods of teaching in training, the results of research on teaching in classrooms cannot ultimately be used to improve teaching at all levels of schooling in order to develop tenable definitions of effective teaching.

Observing the work of four classroom teachers consistently for three years, revealed that there is no doubt that time is a very scarce commodity in schools. Any school which hopes to improve its practices should set up a system which not only involves all those within its walls but also adds no unnecessary burdens to personnel's timetables. School curriculums have recently expanded so that the pressure on time is reaching unbearable proportions. There is however, one caveat, namely, that no school is likely to evolve, discuss, implement and oversee a change to which there will be no internal dissension or opposition. The major weapons for dissent and opposition will rarely be new ones. They will concern the usual questions of lack of time, low pay for teachers, difficult management, making schools non-academic and implementing too small a change to be effective. The three years of research in four schools regarding some of these problems, hold out only one piece of hopeful evidence, namely that in the highest and lowest achieving schools I was appraised of the value various activities many of which I thought had very fuzzy and dubious educational goals and objectives, if any. Similarly, I observed several practices which, in my mind, were ultimately detrimental to the development among students of a wide range of positive social and academic skills. As to time, in each school I observed and counted a lot of dead time - inside and outside classrooms. In my assessment, the most critical problem in schools was not lack of time and resources but lack of organization of available time and resources, in view of the objectives of schooling.

Any institution that attempts to develop and implement changes and practices on the basis of developing consensus among its participants, should also consistently work to avoid the twin traps of stagnation and coercion. On one hand, in a situation where change cannot be implemented because of lack of consensus, stagnation is likely to block future attempts to canvass consensus. On the other hand, coercion is likely to be used where, in the absence of agreement, consensus must appear to have been reached. Pragmatism should be sought in all deliberations. A practice should be adapted only because it enables its practitioners to do work more effectively, and where possible, efficiently. If there is doubt as to what is more effective, then some sort of alternative strategy or experimentation cannot be avoided. What should be avoided is the belief that any strategy will be effective for all schools and practitioners for all time.

The four teachers who participated in this research revealed that change was difficult to implement and sustain by individuals without the support of colleagues. But at the same time, teachers were willing to shoulder the perils of trying. They showed that given a viable alternative to what they were doing, they were willing to try it. I have no doubt that the majority of teachers in Kenya are more than equal to that task.

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Appendix A

Seventy-eight newspaper articles in the two dailies, *The Daily Nation*, and *The Standard*., covering the period1/05/1980 - 1/05/1982 provided public criticism, advise and expectations on the issue of school administration among many other educational issues. The official statements reproduced tended to be mainly "warnings" or "blastings" of headteachers and teachers. Seven examples are quoted below to show the general spirit and content of the statements from people at various levels of society.

1. Kamotho (Minister of Education), 1/5/80: *School Heads Urged to Teach*. "The Ministry expects in future, secondary school heads to be equipped with management skills, but they should realize that they are essentially education managers. The most important duty of school heads is to instill a feeling of involve-ment in both the teaching and non-teaching staff and to ensure that the curriculum is properly implemented."

2. Kamotho (Minister of Education), 12/7/81: *"Missing School Heads Condemned* "The Minister has blasted secondary school teachers especially headteachers who instead of doing their work at school were fond of travelling to town and markets and even engage in private business during working hours. The habit contributed greatly to poor performance by students in their examinations".

3. Muchira (Letter the Editor), 16/1/82: *Transfer of Heads is Timely"*. ...Some heads of schools in national and provincial schools have been transferred. This is a right move... Most of these heads are not in favour of the transfers. In fact they have approached politicians to suspend and eventually block these transfers. The truth about these heads is that some have made their mother tongue the official language and cannot imagine a transfer to other areas. Some national and boarding government schools are so corrupt that they fear their secret dealings being revealed. They have employed relatives and incompetent fellows. Tenders are given to relatives at inflated charges. The T.S.C. (Teacher Service Commission) should ignore any moves towards blocking these transfers. If the implementation takes long a few are going to forment trouble to discredit the new head".

4. Ingutya (Letters to Editor), 16/5/82: *Sack bad headteachers* "I note with concern the way some headteachers run schools. Some of these headteachers are very green in administration and have contibuted directly to problems facing schools. The quarrel with the teachers under them and create disunity that hinders progress. I suggest that such irresponsible headteachers should be sacked".

5. Yusuf (Education Official). 28/4/82: *Appointment of school heads is to be streamlined*"...head master mattered a lot in all the performance of schools. If a headmaster was not on duty his teachers and even pupils come late contributing to poor examination results."

6. Leting (Education Official). 26/1/82: *Stop enrolling extra pupils*. "...Secondary school heads have been warned against over-enrolment. ...they should establish a communication link with students to avoid unnecessary and costly strikes."

7. Andahwa (Education Official): 5/5/82: *Ministry Official Slams Teachers*. "...has criticized some teachers whom he described as stumbling blocks in school administration. He said teachers regardless of their qualifications should co-operate with the headteacher to create discipline in schools. He warned that when teachers and headmaster were at loggerheads, the result was often indiscipline among students which affected the school performance.

Between 1/5/80 and 25/4/84 there were altogether 310 articles and letters to the editor referring to various aspects of education. Using content analysis, these articles were classified into three categories: those referring to administrative roles, functions, concepts and behaviours of headteachers; those referring specifically to the role of the headteacher in controlling teachers; and finally those referring to all other aspects of education such as curriculum, examinations, teacher training, textbooks, resources, distribution of teachers and other related issues. The chart below shows the number of articles in each of the three categories and the 9 main categories of personnel who authored these articles.

Chart 1: Newspaper Articles on Aspects of Education, 25-4-1980 to 25-4-1984

Author		SUBJECT OF DISCUSSION		
		School Head Functions	Teacher Control	General Issues
1. Member of Parliament		9	45	14
2. Board of Governors			2	1
3. Local Authority official		1	13	7
4. Education Officer	5	20	3	
5. Teachers' union member			10	3
6. Head of school		2	1	
7. Teacher		13	10	
8. Student			5	5
9. Parent/citizen		14	67	60
TOTAL		29	177	104

Volume

3

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Teaching and Learning Biology in Kenya

Volume 3
Backbenchers as Pacesetters: A Small Price for Individualism

Catherine Namuddu

March 1989

The International Development Research Centre is a public corporation created by the Parliament of Canada in 1970 to support research designed to adapt science and technology to the needs of developing countries. The Centre's activity is concentrated in six sectors: agriculture, food and nutrition sciences; health sciences; information sciences; social sciences; earth and engineering sciences; and communications. IDRC is financed solely by the Parliament of Canada; its policies, however, are set by an international Board of Governors. The Centre's headquarters are in Ottawa, Canada. Regional offices are located in Africa, Asia, Latin America, and the Middle East.

Le Centre de recherches pour le développement international, société publique créée en 1970 par une loi du Parlement canadien, a pour mission d'appuyer des recherches visant à adapter la science et la technologie aux besoins des pays en développement; il concentre son activité dans six secteurs : agriculture, alimentation et nutrition; information; santé; sciences sociales; sciences de la terre et du génie et communications. Le CRDI est financé entièrement par le Parlement canadien, mais c'est un Conseil des gouverneurs international qui en détermine l'orientation et les politiques. Établi à Ottawa (Canada), il a des bureaux régionaux en Afrique, en Asie, en Amérique latine et au Moyen-Orient.

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This series includes meeting documents, internal reports, and preliminary technical documents that may later form the basis of a formal publication. A Manuscript Report is given a small distribution to a highly specialized audience.

La présente série est réservée aux documents issus de colloques, aux rapports internes et aux documents techniques susceptibles d'être publiés plus tard dans une série de publications plus soignées. D'un tirage restreint, le rapport manuscrit est destiné à un public très spécialisé.

Esta serie incluye ponencias de reuniones, informes internos y documentos técnicos que pueden posteriormente conformar la base de una publicación formal. El informe recibe distribución limitada entre una audiencia altamente especializada.

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TEACHING AND LEARNING BIOLOGY IN KENYA

Volume 3

Backbenchers as Pacesetters:
A Small Price for Individualism

Catherine Namuddu

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CN
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INTRODUCTION

The research study **Backbenchers as Pacesetters: A Small Price for Individualism,** was part of a larger project on **Teaching and Learning Biology in Kenya** which had two aims:

1. To identify practices which take place in schools and classrooms, and to contribute to an understanding of the nature of teacher perceptions and approaches to learning by students which result from these practices.
2. To understand the implications of teacher and student perceptions for school achievement and acquisition of general positive behavioural modalities.

The overall research was guided by a theoretical framework derived from intepretive research methodology (Erickson 1973, 1980, and 1986), with interest centred on exposing and clarifying the everyday human meanings in the life of schools. Emphasis was placed on understanding the immediate and local meanings of actions in education as defined from the points of view of school heads, teachers and pupils. Teaching-learning, whether at school, in classrooms or during weekend seminars, was regarded as an event with complex but interelated processes and products, constructed by the various participants in the event. Processes and results of teaching-learning in particular instances and contexts, were seen as reflecting the phenomena and dynamics of education in the wider society. Therefore, the processes, products and contexts of schooling in the arena of particular instances had to be understood if, classroom teachers, teacher trainers and policy makers were to be able to implement realistic intervention in schools, whether for the purpose of improving teaching and learning or for expanding facilities. In examining education as an interpretive process, it was assumed that a holistic concept of education in Kenya should address at least five key questions, namely:

1. What is education as viewed by school heads, teachers, pupils and the broader society in the context of Kenya?

2. What are some of the characteristics of personnel and resources in Kenya schools?
3. How do various school and non-school personnel actualize the purpose of schooling in relationship to their definition of education?
4. Where and how does education take place?
5. How should education happen?

In the research on **Backbenchers As Pacesetters: A Small Price for Individualism,** only relatively narrow aspects of each of the above questions were directly addressed. One teacher's instructional techniques were documented in order to determine whether or not the teacher's general beliefs, based on notions of the uniqueness of individuals, were translated into the conduct of the teaching-learning process; and if so, in what ways. The focus of the study was one female teacher, 'Lydia' and her class of 40 students at a government maintained and national school given the pseudo name, National High School. Lydia who was 35 years old, held a bachelor's degree in biology and teaching and had taught biology for10 years. This report presents a case study of Lydia's overall personal belief system or 'practical knowledge', how she translated this knowledge into an instructional strategy, and the nature of her student reactions and responses to her teaching.

Conceptual Framework

Recent research on teacher thinking processes has sought to document teachers' understandings and 'practical knowledge'(Elbaz 1983). Connelly, (1980) states that "In carrying out their work, teachers exhibit a wide-ranging knowledge base which grows as experience in decision making increases. This knowledge base encompasses firsthand experiences of student learning styles, interests, needs, strengths and difficulties, and a repertoire of instructional techniques and classroom management skills. The teacher knows the social structure of the school and what it requires of teacher and student for survival and for success. This experiential knowledge is informed by the teacher's theoretical knowledge of subject matter, and of areas such as child development, learning and social theory. All these kinds of knowledge, as integrated by the individual teacher in terms of personal values, and beliefs and as oriented to his/her practical situation, is referred to as 'practical knowledge'.

Therefore, the teacher is viewed as an agent with an active and autonomous role shaped by her classroom experience (Clark and Yinger1978a, 1978b) where his/her practical knowledge specifies the intersection of what on one hand, the teacher values, thinks, believes and decides on, and on the other hand; what he actually does. In other words, it is assumed that what the teacher believes will affect how he behaves; and that such behaviour gives evidence of aspects of belief. Lydia, who was the focus of this study, was interviewed formally and informally on numerous occasions, and 78 of her lessons in one class were observed over a two year period. During interviews, an attempt was made to understand the concepts of her belief system or practical knowledge which supported her decisions and actions. Consequently, the collection of data was based on a general hypothesis, namely, that a teacher's concepts of herself, her knowledge, her authority within the school, and her student's abilities, all influence the actual instructional and participation strategies that are implemented in the classroom. And where a teacher is able to articulate particular personal beliefs which guide her values, decisions and actions, then elements of such a belief system should be visible in the work of teaching.

The purpose of concentrating on one teacher and one class was to achieve what Crossley and Vulliamy (1984) have described as "maximization of the ecological validity of data". Ecological validity refers to the extent to which behaviour observed in one context is generalizable to another. But such ecological validity can only exist if an accurate portrayal of the realities of teaching in a natural or conventional setting has been achieved in the first instance. Therefore, detailed observation and description was focused on how teaching occurs (Mehan 1978), on achievements and failures in the teaching-learning processes as perceived by participants and on isolating unanticipated outcomes of teaching. But in focusing on one teacher and one classroom, with all their attendant uniqueness, the purpose was not to support a generalization about other biology teachers and classes, but rather, to provide an illustration which might be characteristic of far larger numbers of teachers and classes (Miles and Huberman,1984).

In the first chapter, Lydia's beliefs are described. In the second chapter, Lydia's teaching techniques are described against a background of isolating the positive and negative influences of her beliefs in decision making and action during the teaching-learning process. In the third chapter, student reactions to the instructional techniques are discussed with emphasis on pinpointing ways in which students exploited and expanded various elements in Lydia's belief system and in her instructional strategy. The data reported here should be of interest to classroom teachers, and teacher educators who might be seeking alternative frameworks by which to conceptualize the teaching-learning processes at the micro level of the classroom. Data on teacher's personal belief system is important because if indeed, such a belief system is found to influence decisions, actions and practices, this would tend to suggest that efforts in the continued professional growth of teachers should be directed toward helping as many teachers as possible, to reflect on their practices in order to identify and articulate elements of their personal belief systems as a prerequisite to considering improvements in instruction. For without an articulate sense of a teacher's guiding framework for decision making and action, it might be difficult for a teacher to appreciate the need for change. Furthermore, the presentation of both the teacher's and students' concepts of classroom events begins in a small way, to explore some elements of an alternative vision of classrooms as arenas of contestation where agendas are constructed and directed by all those who participate in the teaching-learning process. As Cadzen (1986) points out, "to see children only in their relation to teachers and assigned tasks is to be like 'colonial administrators who might be expected to write scientifically objective reports of the local populace ... by ideologically formulating only those research problems that pertain to native behaviors coming under the regulation of colonial authority'".

Chapter 1

GOOD TEACHERS ARE NOT MADE BY SCHOOLS

"Schools do not make teachers good or bad. But good or bad teachers make good or bad schools." Lydia (1983)

National High School, with about 500 female students, selected from all parts of the country on merit, was maintained by the Government. The school was over 40 years old, and had achieveded high performance on public examinations over several years.

Lydia's Knowledge of Self

Lydia who had taught for 8 years in 3 schools, described herself as a contented mother and a married woman. Lydia's overall personal values revolved around the need to provide for children, not just her own, but also all those in school. An almost obsessive desire for individuality and its definition influenced Lydia's perception of herself, her children, her students and her work. She summarized her overall purpose as "something still to be achieved" and laid emphasis on the value of individuals and their opinions. Lydia said that she had many personal beliefs and opinions about issues such as; education, schools and students which she wanted others to value, explaining that she always felt uncomfortable, "when people make decisions as if others do not exist". Lydia stated that she was a professional teacher, explaining that "commitment to the whole school is every teacher's business, as a professional". She viewed herself as a successful teacher referring to her experiences in a previous school where she had managed to improve the quality of learning without compromising her principles, even though "the school was pretty chaotic". At her present school, she saw herself as a good teacher, "I do my best", even though sometimes things did not go as smoothly as she would have liked.

As a professional and committed teacher, she had however, recently experienced conflicts regarding the ways in which she viewed her teaching and her status. She said that being involved in research had forced her to admit to herself that she wanted to upgrade herself: "I woke up one morning and I discovered that all these years, I have done things for other people, never for myself. Well, I have now decided to do something for myself. If they give me a place, I will go back to university". These 'others' were mostly her family and students at school. Lydia explained that being a wife and a mother had limited her exploration for perhaps, better opportunities than teaching- but she felt that this was not something unique to her and that in many aspects, being a wife, a mother and a teacher had given her satisfaction and comfort. She said that she wanted, to move into new directions in academic work so as to broaden her skills as a classroom teacher, as an examination marker and as a curriculum developer. Her personal needs were encapsulated in the statement, "I really want to do something for myself". Lydia said that she had applied to take a masters degree course. And even before she knew the fate of her application, she had explained that she had not viewed her success as impinging on getting a university place, "the fact that I had the courage to do it [send an application] still surprises me. That in itself is an achievement".

Lydia saw her role in the school as important and valued by school management. "A teacher is important, but I think you have to earn that status". Lydia had been puzzled by the suggestion that some schools ignored genuine opinions from teachers issues such as, control of studentdiscipline and punishment, and had asked, " how are teachers supposed to teach?" Lydia saw her role in decision-making particularly, as head of department, house mistress, and class teacher, as equally important to classroom teaching. Lydia believed that teacher responsibility and duty outside the classroom were part and parcel of school work since students should be brought up first, as good people and second, as learners of biology or mathematics, adding, "I know that the school cannot achieve everything, but it has to try".

Knowledge of the School

Lydia's knowledge of the school was intricately interwoven with whether or not the school was achieving the overall goals of education.

Lydia described Mrs Mambo, the school head, as "tough" - implying that she was feared but respected. Lydia regarded Mrs Mambo as an efficient and effective administrator, with an effective communication system throughout the school, pointing out various personal characteristics of Mrs Mambo which Lydia said were responsible for the head's ability to concentrate on managing the school. Lydia stated that although Mrs Mambo was generally uncompromising, her principles and decisions were based on a foundation of responsibility, credibility, accountability, judiciousness, and pragmatic and eclectic considerations, which meant that while sticking to her decision might be unpopular, the decision would in most cases, appear beneficial to the school. Lydia said that she generally subscibed to Mrs Mambo's overall purpose of a secondary education at National, namely, to develop the whole student to become a good citizen, intellectually and socially. To this end, the school head was said to have ensured that the daily routine was strict and comprehensive in order to give opportunities for all students to develop and grow within an organized environment. Lydia believed however, that the school had been unable to cultivate 'real' individual responsibility among students. She explained that this was not unique to the school because, "as long as there are bells for the beginning and end of everything, students cannot learn to pace themselves and to be responsible for most of their work".

Yet Lydia was ambivalent about the efficacy of practices based on the concept of democracy in ensuring liberty for the individual. She said that she was a democratic individual - by which she meant that she was prepared to listen to other people's opinions. But she pointed out that when it came to act on a majority vote, it was difficult "to know the truth of a majority decision". Lydia had difficulty balancing the individual gains and rights in a majority decision, just as she had problems with what she referred to as the modern definition of culture. She believed that schools should not concern themselves with teaching culture - since students get enough of that at home. The role of the school she stated often, should be to encourage individual development and use of intellectual and creative abilities. But even here, Lydia's stand was ambivalent. She strongly believed that not all individuals were born with talents in music, art, foreign language and so on. She felt that while it was a good thing to expose all children to these creative areas, all children should not be expected to be good in the creative areas. Lydia was particularly sceptical of the school's ability to fulfill the goal of "developing a fund of practical information for everyday living" for each student.

Her opinion was that such "a fund" was interlaced with dogmas, superstitions and unexamined assertions all of which hindered individual intellectual development and autonomy, which she saw as the prime function of the school. On the question of linking schooling with productive work, Lydia believed that even though the theory and counselling about work might be given at school, it was unlikely that school would provide sufficient practice in the skills needed for various jobs. Lydia believed that at secondary school, the only job teachers had competency to talk about was teaching - and not any of the other jobs performed in society.

Lydia regarded her present school as an excellent teaching and learning environment. Her belief stemmed from a comparison of her school with two schools at which she had previously taught. But she believed that "teachers as a group" were in large measure, responsible for the kind of school they worked in. She emphasized that a pervasive state of commitment to the school was the fundamental condition necessary in any school's welfare. "As soon as teachers are not committed, then you can expect chaos". She described her school as one where the headmistress dealt with each teacher as an individual and within a spirit of absolute trust, in the teacher's ability to be responsible, to do what is good for the school and to do more than what duty called for. "With this trust a teacher knows her role and she does not dare misuse her authority". She described the school head as strict but humane in dealing with everyone. This humaneness was based on the fact that the head was sure of herself, intellectually and socially, and could therefore, trust others, "she knows that when I send a message that my child is sick, the child is sick. So her concern is to see that the work I have sent with the note is delivered to the class monitor. But more important than this, she knows I will make up for lost time".

Lydia was quite aware and disturbed that teachers in other schools misused such trust and privileges but she insisted that this was the result of appointing people who were not capable school heads and who created chaos for teachers in an attempt to be seen to work, "they treat you like a casual labourer". Lydia described her standing within the administration as not unique to her but as a general state for all teachers in the school. She admitted however, that there were always some complaints because it is a lot of work. "You are never really free. You have little leisure time; books have to be marked; assignments given; classes made up; you stand in for others just as they stand in for you; night duty and housework have to be supervised; but this is life, isn't it?" Lydia strongly believed that regardless of how inefficient or inhumane a school head was, if teachers were committed to the work and the school and were united as a group they would would be able to guide the head. "They will straighten him out".

To Lydia administration, schooling, education and discipline were really a continuum, "I cannot see how I can teach without discipline. I have to have support and authority so that I can punish when I see fit. If the administration does not have support for teachers, then I don't see how the students are going to learn". But despite Lydia's committed involvement in all aspects of school life, she remained detached and distant from the school head and the student body and she liked to maintain that stance, status and distinction. She preferred to refer to all this as respect. "The headmistress must have respect for teachers and the teachers must have respect for the headteacher. And we must give each other space to breathe. The pupils have to respect all". Asked whether staff in the school respected students, Lydia clarified her stand, "it is not that I look down on anybody. But I think in a school the proper thing is for each person to know his place. Whether or not that is respect I don't know. But at least, it ensures that everyone is clear as to who gives orders and who obeys them". Lydia had explained that there was no need for teachers to be either for or against students, "there is no need for that in the school", implying that the school as a whole took one stand on how students should be treated either in the totality of the school or in the classroom. But Lydia insisted that in class and outside, she was prepared to take the individual's opinion into account before, for example, punishing a student.

Lydia's main concern with regard to educational management in general, and its effect on the conduct of the teaching-learning process was what she defined as, "the increasing number of new decisions on education which have little or no chance of working," and which she thought were detrimental to the whole educational enterprise.

She quoted a recent personal experience where she had spent several sessions counselling her primary school age son when he had almost quit school because he was constantly failing in the arts and crafts subjects, which the school was stressing that year as part of the new 8:4:4 educational system. Lydia's point was that her son had been doing very well in mathematics, English language, Kiswahili and other subjects, but that he had very little imagination and talent in construction activities which the arts and crafts curriculum emphaisized. Her son's class teacher had given him failing grades on all class work in crafts, until the boy had began to believe he was no longer intelligent enough to do school work. Lydia was unprepared to accept the alternative view that traditionally, the educational system had treated as failures in the schooling arena, all children who could not, for one reason or another, perform very well in mathematics, English language, Kiswahili and other subjects. Instead Lydia insisted, like many other parents, that it was the fault of the new system and not the nature of the total educational enterprise.

Similarly, Lydia was apprehensive of the recent trend to fill national schools such as National High on a quota system because she felt that such schools might get some students who did not make the mimimum grade for entry. She said that in some cases such girls might be able to "catch up" with the rest of the class, but that in many cases, they could not and their presence only denied a place to other students who could have made better use of the school's curriculum and facilities. Lydia apportioned the blame to politics and the increasing politicization of school affairs, "now that politics has started to interfere with education, there will be problems". Lydia believed that schools in most cases knew what was good for students and that they should have a say in what goes into new curriculums and policies. Lydia was however, generally uncomfortable in talking about politics explaining, "there is very little of it [politics] in this school". As to the wider national political context Lydia had stated, "I think I am confused about a lot of things these days".

Knowledge of Subject Matter of Biology

Lydia stated that university courses had given her sufficient background for teaching biology at school explaining that "all" biology consisted of a clearly defined set of concepts which one acquired by doing experimental work and reading. Lydia said that she was out of date with the modern biology, " if I go back to school I will up-date myself". Reminded that she might not be able to teach this "new" biology at school, she had insisted, "all the same, I need to up-date myself". Lydia stated that she had been interested in biology right from school. At university she had specialized in zoology and botany, but while there were courses such as ecology, where as a student, she had had a real opportunity to do scientific experiments, many other courses had provided experiments simply to prove a point. Lydia had pointed out, "if the Ministry expects biology to be taught practically at school through the scientific approach, then it [MOE] should first, ascertain that it [biology] is similarly taught at university". Perhaps the best definition by which Lydia characterized authoritative knowledge of biology was in her description of the kind of biology taught in some schools where she said there were no laboratories. "I don't think the student is learning biology. He is learning information on biology". Lydia stated that she herself relied on the availability of a good laboratory to enable her to duplicate correct concepts and procedures in biology. She said that a capable teacher might be able to use the environmental approach to teach biology without a lobaratory, but " such a teacher would need three times the number of periods we now have." While Lydia wanted each student to learn some biology, she stressed that students should be taught and examined only under conditions where a reasonable type of biology had been taught.

Knowledge of Students

Lydia, just as everyone in and outside the school, had stated that "we get the cream. The largest majority are bright girls, eager to learn and they work hard." Lydia for example, knew that every student in her research class of 40 was bright except for one student. "This girl has several other problems - so her classwork is not a surprise to anyone any more". Lydia's knowledge of students was intricately interwoven with the processes of instruction in general, and teaching and learning biology in particular. Lydia believed that at secondary school, students cannot learn all that they require to know without being taught by a teacher. The concept of individuality permeated Lydia's perception of students and their organization as a group for learning purposes. She said that she was "acutely aware" of the constraints imposed by large numbers in attempts to individualize instruction, and she attributed student inability to grasp simple biological concepts as the result of shortage of class time. Lydia asserted that because class time was so limited, she could not give opportunity to individual students in order to express themselves by asking questions and describing content in their own words: "I am shocked every day. You teach something and you ask questions, you get some correct answers and you assume you have taught well and that everyone has understood. Then next lesson, you give a couple of revision questions at the beginning of the lesson and you discover confusion. You start wondering what they [students] understood the first time".

Lydia stated that in the past, students were much more likely to learn something the first time, than her current students. Lydia did not have a definite explanation for this development, but she suggested that students probably found it difficult to "just listen". She said however, that some students applied a certain amount of control over classroom events and that this had something to do with what Lydia described as individual rights. But Lydia had stressed her own upperhand in the matter, "the girls have a right to learn - alright. But there are certain things I will not have in my classroom". Lydia said that she, just as all teachers in the school, was not prepared to work when girls were shouting, or when they were sloppy or rude.

Knowledge of Processes of Instruction

Lydia said that there was no compromise in teaching sciences, "if you want children to learn biology, then you teach them in such a way that they learn biology". Lydia said that her approach was based on authoritative content so that whether or not she uses local biological examples, the knowledge taught has to be correct and authoritative. Lydia said that students had to learn through lecturing and through practical work, using reasonably equipped laboratories with at least, a minimum set of all the apparatus prescribed for particular levels. While Lydia supported the environmental approach to teaching biology, whereby she meant that students would use local examples to learn the basic biological concepts, she explained that, "the variety of phenomena out there, about which we have incomplete information, may bring problems, because as a teacher, you are yourself not sure". Lydia said that she preferred to stick to the beaten path, deal with known content which she knew was correct and authoritative. "Oh I don't prevent students from telling me what they have discovered by themselves locally. But if I am not sure of the authenticity of the information, I tell the students that they are on their own". Lydia stated that she emphasized that students should investigate their claims until they are sure of those claims.

Lydia saw her role in class as that of planning content and organizing materials and resources for learning and teaching. For Lydia, planning content meant, gauging the level of student knowledge and planning a lesson with this mind. She regarded the classroom as a place where she could give her knowledge of biology and pass on to students skills she had already mastered. Lydia said that she had developed a "workable instructional strategy". She explained however, that the strategy had been more or less forced on her by constraints of time since she had found it frequently impossible to assess formally, student understanding of concepts. At first, she had tried to have a quiz in each lesson as a mechanism to get students to learn their previous lessons, but time had been a problem. She had developed an alternative that enabled her to teach concepts while at the same time evaluate students understanding.

Lydia regarded the processes of instruction as difficult stating that the more years she taught the more she found that teaching was complicated. Her elaboration on this point indicated that Lydia did not find elements of difficulty in aspects regarding content presentation during the instructional process itself, but in assessing students understanding, namely; comparing what and how much she had taught to what students had actually learned in any one lesson or a series of lessons. Lydia firmly believed that there was marginal differentiation between theory and practical lessons, "you cannot really separate the two". She explained that her stand on this issue was different from that of many other teachers, and explained that this was one reason why her classes were often behind other classes in theoretical content. "I am always having practical work interlaced with lecturing. Another teacher can say, we are doing a lecture or we are doing a practical and they finish that practical. To me, I tend to have a practical in every lesson, so I suppose I go on and on". Lydia was however, particularly ambivalent about suggestions that she should teach not according to her own pace, but according to the pace of other teachers in other streams, even though she admitted that she was at times, catching up, disregarding some of her fundamental beliefs about individual learning. But she asserted, "In the final analysis, nobody really covers the syllabus, so I have to decide according to my students". Asked why sometimes she did not stick to her beliefs, Lydia had replied, "As head of the biology department, I can't afford to always be the one who has not completed work allocated to a term".

Lydia explained that to her, time was the most limiting factor during the teaching-learning process: "the bells go so fast before you have done almost anything". Lydia was however, unprepared to seek alternative ways to use time. Asked whether or not there was a possibilty that she wasted time re-teaching simple concepts which she had not properly consolidated in the first instance, Lydia was adamant that her teaching sequence of concepts was right for her pupils, "It is the amount of time which acts against ensuring that the concepts are properly understood". Reminded that in the coming years, the biology curriculum was likely to be even more crowded than at present, Lydia said, "I am dismayed that politicians should have been left to dictate curriculaums when they have little idea of actual school timetables, facilities, and students". Reminded further, that it was not politicians who designed curriculums but the KIE and the country's biologists - Lydia explained that schools as a group had made little effort to inform the public and the KIE of the real constraints of time under which teachers operated.

On the question of whether or not examination demands were a stimulant to schools to purchase needed equipment and improve their teaching, Lydia replied: "all these things work only in those schools where there is already teacher commitment to work". In other words, Lydia saw teacher commitment as the essential prerequisite to good teaching though she did not view this commitment as capable of transcending the physical limitations of resources.

Lydia said that her perceptions of teaching biology at school had changed over the last couple years due to her increasing teaching experience. She said that at first, she had taught very much like at university. "You simply give the concepts and experiments and you don't worry about how many students have understood what you said". But slowly, she had found that she had first, to re-organize many concepts before they could be grasped by secondary school students. She said that this was something she was still grappling with in her day to day work because, "the students change each year. Every year you spend the first term trying to learn the best methods of presentation to a new class".

Lydia said that she believed that her own instructional abilities could be improved although she was unsure how. She, for instance, refused to "see" how she could organize content and use time more effectively than she was already doing. She believed that the main reason why students in her school were not all getting distinctions in public examinations in biology was not because she or other teachers taught badly or because students did not work hard, but because examiners were unsure of the depth at which teaching biology at school was possible. Significantly perhaps, Lydia was very warry of change and what she referred to as instructional experimentation, which she said was capable of, "over-throwing everything I have already accomplished without certainty as to the 'real' results of the new system". Lydia implied that in a high achieving school such as National High, where students were already achieving at near the top, any new instructional technique designed to improve achievement would have to have "something out of the ordinary" in order to stimulate adoption and acceptance by teachers. Lydia was not impressed by the suggestion that the real changes might have to be small, incremental, and perhaps even elusive additions to what already existed. She had asked, "who will notice those?"

Origin and Stability of Perceptions

Lydia recognized the dialectical influence of her role on the school and that of the school on her beliefs. But she did not consider this as a significant determinant of the stability of her beliefs. She said that different administrators coming with different beliefs may implement various and differing acts in school, but she insisted that a teacher's beliefs do not change just because a new headmistress has come in or just because the teacher has been transferred to a different school. Lydia had little to say about the sources of these beliefs but she argued that she had always wanted to do things her own way. She appreciated the range of factors that acted against this, in school and in her family, because of group living. She pointed out however, that working in various schools had not created these beliefs but that the experiences had underscored for her, the need to have her own firm principles, "otherwise, every time you are posted to a new school, you change". As an affirmation of Lydia's belief in the uniqueness of the individual, she had explained that unlike popular belief, "schools do not make teachers good or bad - but good or bad teachers make good or bad schools". Lydia often emphasized that it was pointless to blame a school head for a bad school - because by definition - three essential components had to be there for something to be called a school, namely; a school head, teachers and students, and that all three should be apportioned blame whenever there were problems in a school.

Lydia implied that the origin of her perceptions of schools and their management had not changed much since she started teaching even though she believed that her teaching effectiveness had increased. She said that education courses at university had prepared her well for teaching content but they had not prepared her at all, for the actual practices she found in schools. She however, thought that there was little that university courses could do on the issue since schools were very different, "this is something you discover as you are transferred from school to school". She stressed that the fact that schools were managed differently should not, of itself, mean that a teacher changes her personal principles. Asked whether it was not difficult to work in a school where her personal principles did not agree with those of the school, Lydia replied, "that's why you seek transfer. It is a burden to work in a chaotic school". Lydia did not think that her beliefs would change with time - if anything, she belived they would be further cemented by "age". She did not agree with the suggestion that further education would change her beliefs per se but that, "just as this research has opened my eyes about the problems in teaching and learning, I am now much more conscious of myself and the impact I make on students when I say something. Further education will open my eyes wider". So Lydia saw the role of more knowledge in this static way - she did not seem to realize that her statement about research suggested that her beliefs about teaching and learning had already altered somewhat from what they were before her participation in the research.

Summary

From the foregoing brief survey of Lydia's perceptions and beliefs, the salient issues of her personal belief system which might be expected to relate or influence her instructional techniques concern three factors, namely: her concepts of the school environment as a decent place of work; the nature of suitable instructional methods for biology; and the intellectual capabilities of her students. It is evident from the description that although Lydia' beliefs and perceptions on all three issues had various elements of ambivalance, her total perceptions can be characterized as positive. First, Lydia believed that school management recognized not only her individuality but also the fact that she was playing an important role in decision making, teaching and general school management. Consequently, she regarded management as supportive of her decisions and actions in these various roles.

Second, Lydia's beliefs based on notions of the uniqueness of the individual which was the foundation of all her perceptions of other people's beliefs and actions, was liberal. For instance while Lydia regarded the head of her school as "tough and uncompromising", she however, recognized the pragmatism of the head's actions and decisions for the benefit of the school as well the head's eclectic consideration of individual teachers. Similarly, Lydia saw the importance and necessecity for teachers, students and for individuals in society to express their opinions, even though she herself was unsure of the final nature of benefits of the majority's opinion for the individual.

Third, Lydia's very positive perception of the abilities of her students enabled her to set very high expectations for their work. And although lately, Lydia did have doubts about student performance, she did not regard student failures as the result of their personal capabilities but as due to a combination of various environmental factors such as: political intereference in school work, lack of time and student inattention. Finally, although Lydia's concept of biology as a discipline was not very articulate, it was nevertheless, clear that her perception of a suitable instructional method had many facets such as suitable resources, teacher commitment to the scientific method, and frequent assessment of learning. The next chapter portrays how Lydia combined these various elements in presenting biology content to her students.

Chapter 2

AN INSTRUCTIONAL STRATEGY 'MAKES' STUDENTS

"The teacher's blackboard notes are a mixture of English, Greek, and some other language which would throw her into a fit, if a student used it in her assignments". Student (1983)

Introduction

Lydia's instructional strategy was supported by three crucial factors. First, Lydia believed that she knew the content of biology well and authoritatively and that this content had to be taught in an authoritative manner, which meant that she had to be the single most accurate resource, arbitor and purveyor of biology knowledge in her class. Second, Lydia saw the process of learning biology as consisting of the interrelated student activities of listening attentively; asking questions; observing and performing experiments; and learning how to write accurately what students hear or observe. Third, Lydia knew that since time was the most important constraint in her instructional procedures, its use was crucial at both the individual student' and group levels. Lydia's instructional strategy was somewhat undifferentiated and thus very difficult to categorize into steps. However, it appeared to have three main steps:

1. Introducing the lesson by asking questions.
2. Lecturing, assessing understanding, students writing, teacher monitoring of student work and teacher setting up the laboratory.
3. Student experimentation and observation.

Introducing the Lesson

Settling Class

Lydia's single period was held on Tuesday as the third lesson before morning break. The students always came from a geography lesson taken in the classroom, so that they had to run only a few seconds to get to the laboratory. Lydia's double period was held on a Thursday, the fifth and six lessons of the day. This meant that students came to the class after a fifteen-minute morning break and ended the class on their way to lunch. These time schedules were important because student lateness was not a problem, Lydia therefore, had almost no lesson sequence that could be rightly called settling class. Students ran to class on Tuesdays; and on Thursdays, they arrived in the laboratory during break time and settled themselves long before the bell for class. When Lydia arrived in class, students would stand up to greet her in unison and promptly take their seats.

Lateness for class was regarded by the whole school as a serious crime and was therefore, rarely committed without very good reason. The strictness by which both teachers and students regarded lateness and its disruption of a class already in progress, can perhaps, be illustrated by three separate episodes that took place during Lydia's lessons. First, when in 1983, four weeks into first term, some new students had arrived 3 minutes late for biology, Lydia had been upset. Students had explained that the teacher of a geography lesson had kept them longer than expected after the bell. Lydia had advised the class monitor to warn the teacher whenever the end-of-class bell rang. The following week, the same students were again, 3 minutes late. The third week however, the students arrived "on the bell". Lydia had explained to the researcher later, that the students had a trainee teacher for geography, adding, "I have had a long talk with her. I think she has everything straight now".

Second, on 5/10/84 Lydia had begun the lesson by asking students to look up, in their assignment books, the food chains she had asked them to construct as prep at the end of Tuesday's lesson. While she was talking, a student, Dina, who had come late, was standing outside the open door but Lydia could not see her. After Lydia had given instructions, she moved into the preparation room next door, to collect something. During that instant, Dina had sprinted into the laboratory and had scrambled to the nearest empty seat which unfortunately, happened to be at the back, so that Dina had been 'caught' just before she got seated. Looking sternly at Dina, Lydia had commented, "If by now you don't yet know the procedure when you come late to class, I doubt very much whether you should be in this school at all". Dina had received two punishments after class; one for being late and another for "sneaking" into class.

In a third episode on 26/9/83, Lydia had started lecturing and the class had been in progress for 7 minutes, when there was a knock on the door. Lydia had turned sharply towards the door, and then surveying the class, had exclaimed, "good gracious! Someone is coming in at this time! Who is not in?" Then she had shouted, "yes?" A student had opened the door and made her way toward the platform where Lydia was standing. As the student began to say, "excuse me Mrs..... Lydia interrupted her with indignation, "but you don't belong here! (class laughter). Who are you? What do you want?" The student had explained that she wanted to collect her notebook which she had forgotten in the laboratory. As the student hurried to pick up her book, Lydia commented more to herself than to the student, "and from whose class are you roaming about the whole school at this time?" (Laughter from the class.)

Entry into the Lesson

Lydia always began her lessons by asking students questions, which can be referred to as checking questions, which she said served both to assess learning prodecures and to give her a point of entry into the lesson. These questions were of two types. For instance, Lydia might pose the following questions:

1. Did we complete everything about food chains, so that we can do something about food webs?

2. Were you asked to make any food webs?

3. I remember, I left you to copy the food chains on the blackboard. Have you all completed that?

4. I don't know whether you have all this in your books. Do you?

The first two questions represent examples that were used by Lydia to assess where the previous lesson had ended, while the last two represent examples that Lydia used in an attempt to assess how far students had progressed with written work from the previous lessons. Apparently, Lydia would ask these types of questions not with total ignorance of either where to start a particular lesson, or how much information she had covered in a previous lesson. Lydia had stated that the reason for asking checking questions was that she wanted to get students involved into the lesson right from the start by encouraging them to remember what they had already covered, and at what particular point in the lesson they had stopped. Lydia often combined these kinds of questions with a perusal of two or three student notebooks, presumably, to ascertain that what students, who were answering her questions were claiming, was actually true. But asking checking questions and perusal of studentnotebooks appeared to be a crucial element in Lydia's overall instructional strategy. Out of the 78 periods observed, Lydia had begun 49 (62.8%) by asking checking questions, and in 32 of the 49 lessons (65.3%) she had also examined student notebooks.

It was possible to identify a pattern among lessons that Lydia began by asking checking questions and perusing student notebooks. As will later be explained, Lydia was always very strict about gaining the complete attention of her students while she lectured, and did not allow students to write during these episodes. This meant that if a lesson ended while Lydia was still lecturing, students would not have had time to write their notes on what Lydia had been saying. Whenever students were making notes, Lydia would go around, monitoring, marking notes, reading and suggesting changes and corrections to student notes. It seemed that the monitoring excercise enabled Lydia to get a notion of where students were at particular points in the lesson, so that she would probably make a mental note and decide on where to begin the next lesson. If however, a lesson ended when Lydia had not completed her monitoring, and without the aid of a 'visible' lesson plan as a record of work covered, Lydia seemed lost at the beginning of the following lesson, and had therefore, to refresh her memory by asking checking questions and examining student notebooks.

Invariably, Lydia did not use a lesson plan, because she believed that she knew the content of her lessons. Hers was a very loose and open ended mental plan. Three factors about the instructional process undergirded Lydia's apparent uncertainity in setting definite lesson plans. First, since Lydia believed that theory and practical work was a continuum in the teaching-learning processes, she rarely specifically planned for either practical or theory in any lesson. Second, Lydia did not believe that what she had prepared before a lesson, should dictate what was actually done during the lesson. Rather, she depended on monitoring the progress of student work in order to assess what was happening and then decide on what to do next. Third, since all Lydia's lessons were held in the laboratory, this enabled her to have either practical and/or theory during a single lesson at any stage she saw fit.

Lecturing, Monitoring and Student Work

Invariably, Lydia preferred to give theory first as guidance to the related practical work that would follow. Since parts of practical lessons transcended into parts of theory lessons, there was only what can be characterized as practical or theory episodes in any one lesson. This 'transitional' treatment of lessons meant that Lydia rarely 'concluded' a lesson in the usual sense and it was the end-of-class bell that ended lessons. The transition of practical into theory episodes and vice verse, within a single lesson, was most eloquently demonstrated by Lydia's blending of five major components of her lessons, namely; verbal exposition, note-writing by students, monitoring, setting up lab, and carrying out practical work by students.

Exposition Followed by Student Note-making

After ascertaining an appropriate point of entry into the lesson, Lydia would introduce any new concepts by defining, narrating, describing, and explaining a concept from its logical and authoritative point of reference. During this exposition, lasting anywhere between 5 to 15 minutes, Lydia demanded, insisted on and enforced the absolute and undivided attention of every student, with her famous -"heads up, pens down and books closed"-directive. Here Lydia was giving the crucial and vital content about a concept, or about the procedures to be followed in an experiment or an observation excercise. Lydia believed that this period of student total attention to the teacher was the foundation of proper learning because it formed the basis of all other activities that would follow. During exposition Lydia would jot on the blackboard in abbreviated form, the important elements of her exposition.

Lydia said that she "knew" how much content to deal with during exposition before allowing questions from students. Apparently, Lydia judged this amount as equivalent to "enough points" that could be remembered by a student at a particular level, and which the student could use as a basis to make detailed notes on her own. A typical verbal exposition episode from Lydia's lesson held in 1984 (form 2) on *Digestion* illustrates the use of entry questions and the exposition technique.

01. Lydia: We had yesterday started on digestion. What was the last thing we said yesterday? Open your books, and put up your hand. Yes?

02. Sheila: We had talked about the thick wall. The stomach is the extension of the mouth with thick walls.

03. Lydia: Very thick walls. What else? I think we talked of something else.

04. Students: No.

05. Lydia: Now, I think we had completed digestion in the mouth, isn't it? I think we were going to start digestion in the stomach. We had said that the stomach is an extension

of the gut. It has thick walls, muscular-muscular, thick walls.

06. Students: Uh. Uh.

07. Lydia: Now its got muscular thick walls that are - its entry - I remember I had drawn this - did you draw it ? (Drawing a longitudinal section of the stomach.)

08. Students: No.

09. Lydia: The entry to the stomach is guarded by? - Does anyone know?

10. Students: No.

11. Lydia: Kanini! (Kanini has been looking out of the window) The entrance is guarded by muscles which can close it and open it. These kinds of muscles that open and close are known as sphincter muscles. These ones (demonstrates with BB diagram) being near the upper side of the body, near the heart, are known as cardiac sphincter. Sphincter muscles guard entrances- guard entrances into a tube. In other words, the entrance of substances into a tube. If these are closed, no more can enter. Oh, and what would happen? What would happen? Hands up. Yes?

12. Grace: You would vomit.

13. Lydia: You - whatever - you cannot kind of swallow. You swallow and then it wouldn't stay and then you would have to throw it out. On the other side, you have the similar muscles and these are known as the pyloric sphincter muscles. So now this guards the entry on to the first part of the small intestine. The first part of the small intestine forms a U-shaped loop (draws diagram on blackboard) and this is known as the duodenum. So the entry to and the exit from the stomach are guarded by?

14. Students: *Sphincter muscles.*

15. Lydia: What could be the use of this? (Pointing to the pyloric sphincter on the BB diagram.)

16. Students: (Silence)

17. Lydia: No idea? OK. What happens then in the stomach. Digestion in the stomach (title on blackboard). As we said that its got thick walls, these thick muscles contract and relax several times and the result is that the food is churned - or mixed about, as this part contracts, the other part contracts and relaxes (demonstrates using diagram on BB). So you have the food churned or churned many times as a result, it is mixed with? (Waits for students' answer) Digestive?

18. Students: *Juice.*

19. Lydia: The digestive juice, here is produced by the walls of the stomach which happen to be glandular. In other words, you have glands present in the inner wall of the stomach. OK. So these glands secrete enzymes and this digestive juice is known as gastric juice. So gastric juice is now mixed with the food as a result of the contraction and relaxation of the thick muscles of the stomach wall. The food is mixed up and in the process, it is acted on. So you see, it is necessary that the food does not leave the stomach as it is being churned or turned about. It is kind of enclosed such that its turning about will enable complete action and the muscles, the sphincter muscles, will open when digestion is completed. Depending on the type of food, the food may stay in the stomach in the region of - of 3 hours or so. So this digestive juice contains now digestive enzymes. Other than enzymes you have hydrochloric acid, hydrochloric acid or HCl. You are familiar with this aren't you?

20. Students: Yes.

21. Lydia: Now hydrochloric acid is an acid - what does it do? What is its function in the stomach? One, it kills. It is not a dilute acid. It is quite a concentrated acid. It kills bacteria, any bacteria or any germs, micro-organism etc., all these mean the same thing, that may have been swallowed together with the ?

22. Students: *Food.*

23. Lydia: The other thing it [HCl] does is that now, it changes the food. When it was swallowed it had an alkaline pH which was derived from where? (Waits, but there is no reply.) From the saliva from the mouth. So it changes the pH from alkaline to acidic. So that is what HCl does. This is necessary. The pH of the food has to

> be acidic because the enzyme which we find and the enzyme is known as pepsin, the enzyme which we find only acts in a certain medium. This requires acidic media. So that is a very important function in that as we were talking about enzymes yesterday, (in a different class?) they only work at a certain pH. That is a particular enzyme works only at a certain pH. And now unlike - ptyalin in the mouth, the stomach, the enzyme in the stomach require acidic pH. So it is important that we have hydrochloric acid there. Hydrochloric acid now changes the medium to acidic, and now you have pepsin acting on proteins. Proteins in the presence of pepsin, have the acidic medium, are broken to peptones. What are peptones? They are smaller chains - right? Now we have already seen, from the study of food, that proteins are made up of amino acids and the peptones, which are longer than amino acids. So the work of pepsin is to thrush these long four two, OK etc. peptones. We have got something else - that is why I thought of hydrochloric acid - and that is the work of rennin, something we find in the stomach. It is rennin - the milk protein, known as casein, is converted to a kind of solid structure so that it does not flow and escape on to the next part before being acted on. So rennin coagulated the milk protein. So casein, it coagulates - the milk protein - coagulates (emphasis) - so that it can, in the process be acted on by the enzyme pepsin that acts on the other proteins. After all that is done, now the food is ready to leave t the stomach. It is in a semi liquid form and this is known as chime. OK? So after all that is done, the chime is now ready to leave the stomach - is ready to proceed on to the next part of the small intestine. Now I would like you to make some notes from where we left off about the stomach - the structure - the inner walls, that the inner walls have got glands that produce gastric juice, the fact that you have the entrance and exits guarded by sphincter muscles which are - the cardiac and pyloric sphincters, and then the juice produced, the action of the muscles of the stomach wall in contraction and in helping mixing food. And finally, the gastric juice what it contains - three things, and this pepsin -for digestion of protein, hydrochloric acid for the provision of an acid medium and rennin which acts on the milk protein.

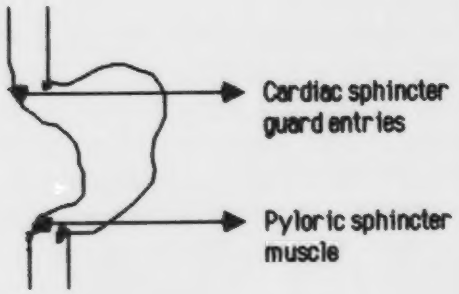
This long segment has been presented for two reasons. First the segment illustrates a typical exposition sequence - where Lydia demanded absolute student attention, with a few rhetorical questions to students. The pace of delivering content was quite fast, the above segment, for example, lasted 11½ minutes. Basically, Lydia presented the main points of content and defined the key concepts such as glandular, sphincters, proteins, peptones, amino acids, casein, hydrochloric acid, gastric juice and others. Perhaps more significantly, for her purposes, Lydia described and narrated the events, functions and processes of the structures and components in the digestive system. At the end of the segment, Lydia told students to get ready to write notes on what she had said, and apparently assisted them in this activity by summarizing some of the main points of the segment.

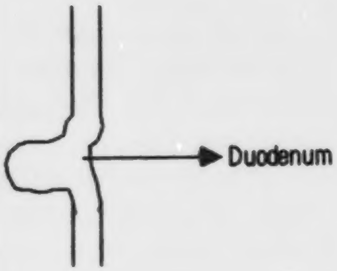
The second reason for presenting the segment, is to provide a notion of the depth of content at which Lydia taught - in relationship to the process of making notes by students. As already indicated, students were not allowed to write while Lydia gave this type of exposition. Lydia would jot notes on the blackboard, which students would use as a guide in reconstructing the notes to particular lesson segments. The paucity of words (italicized) that were contributed by students to Lydia's long exposition would seem to underscore evidence that students appeared to be hearing most of this information for the first time, and had therefore, to listen carefully while Lydia defined, described and gave examples of various concepts. Lydia did not usually, attempt to assess student understanding at the end of her exposition. She simply asked students to make notes - using the blackboard outline as guide. Lydia might however, assess understanding by answering individual questions as she went around the class monitoring individual student note-writing.

How useful was the outline of notes on the blackboard, as both a consistent summary of Lydia's exposition and as a guide to individual students' notes-making excercise? Lydia never used complete sentences in blackboard work; rather, she employed incomplete sentences, phrases, abbreviations, rough diagrams and used arrows to indicate words such as processes, reactions and products to represent relationships. Although the blackboard notes would be systematic in sequence, their appearance was 'coded' and often chaotic. Sheila, a student, had once described Lydia's blackboard notes as, "A mixture of English, Greek and some other language, which would throw Mrs ...(Lydia) into a fit, if a student used it in her assignments". Lydia's students regarded much of the blackboard notes as abbreviations, and therefore, one reason for the large number of student questions during Lydia's monitoring, was to verify something on the board. By comparing the amount of detail in the exposition with Lydia's blackboard outline on the same segment shown in Chart 1 below, an outline which students were expected to follow, once again underscores the potential difficulties which might be encountered by students during note-taking.

Chart 1: Teacher Outline of Notes on Blackboard

Stomach
- thick wall
- musculer


Cardiac sphincter
guard entries
Pyloric sphincter
muscle



digestion

--------> churned
--------> mixed
Juic [Juice]
--------> wall -------> glandular

Gastric Juice
--------> Enzymes
--------> Hydrochloric

Acid HCL
1. Kills bacteria, germs
2. Changes pH fr alkaline ------> acid

continued..

3. Coagulates
-------->Curd
-------->pepsin ------->requires acidic media
-------->protein
-------->peptones
-------->rennin
-------->casein
Coagulates
-------->acted by semi- liq [liquid]
-------->chime ------->duod [duodenum]
-------->chime

The majority of students (20-22) managed to use these abbreviated notes with no apparent problem. Most of these students, wrote notes by simply incorporating the keywords in the blackboard outline in complete sentences. The notes composed in this way were often brief but accurate. Other students (12-15) however, could only manage to negotiate these notes by constantly asking clarification from Lydia and by holding discussion among themselves. These students, however, often wrote out long and accurate extracts covering 5 or 6 pages. Perusing through these notes indicated that students were able to follow Lydia's long exposition and re-enact and reformulate its main components in their own words. But these student techniques of holding discussion among themselves often caused consternation to Lydia, as will be explained later. Only two students were observed to have failed to make accurate notes from this particular lesson segment. Their confusion arose mainly because they had not understood whether 'coagulates' was a noun or a verb. For instance, one student had written that coagulates include curd, pepsin, protein, peptones, rennin and casein. Under a different topic, such a statement might have been considered correct, but in this particular case, 'coagulates' had been used as a verb to describe the action of acid on milk.

Exposition with Assessing Student Understanding

Sometimes Lydia conducted the exposition segments with much more student involvement in constructing the lesson's conceptual content while at the same time, attempting to evaluate student understanding. Lydia often used this technique whenever she knew that students had prior experience with most of the concepts under discussion. During a lesson on *Vertebrates* in September 1983, Lydia had asked students, as part of their homework assignment, to study the main stages in the development of a frog, by observing tadpoles in a water tank kept in the laboratory. During the following lesson, Lydia had conducted the first 15 minutes as follows:

01. Lydia: Now I think we had completed the discussion on vertebrates. Have you made the drawings?

02. Students: No.

03. Lydia: I wanted you to look at some of the stages of the development of frog and then - the main idea being to compare the young of the frog and the young - and the adult. Who knows anything about the young of the frog as compared to the adult frog? Yes Wanjiku?

04. Wanjiku: The young of the frog lives in the water while the frog lives on land and water.

05. Lydia: So the young lives where?

06. Students: In the water.

07. Lydia: In water. And the adult?

08. Students: On land and water.

09. Lydia: So that is a difference as far as where they live and then what is the difference? (pause) What else? What else Sophia?

10. Sophia: The adult - the young moves by gills no - webs - the adult? By legs?

11. Lydia: Hum! Moves - legs - with legs-webs - and the young? (Sophia looks unsure with hands on her mouth) Yes? You want to complete or someone else to complete it for you?

12. Sophia: Someone else (class laughter).

13. Lydia: Yes? (points to Damaris)

14. Damaris: Has two legs.

15. Students: What? (class laughter)

16. Lydia: Damaris, I think we better talk of two limbs or none. What do you think?

17. Students: Two. None. Which? (many students talking all at once)

18. Lydia: Alright - someone is saying both. OK now I will expect you (whole class) to explain that. Who has it correct? Yes? Muithera?

19. Muithera: I think the adult has - moves by both the front and back limbs while the young moves only by the front legs - limbs.

20. Lydia: OkK In other words, perhaps what we should say to be correct is that one moves with the forelimbs, one with the back limbs. Is that correct? Yes? (to Taiva who has been looking out of the window).

21. Taiva: (Inaudible)

22. Lydia: Did you hear that Muithera? What do you think? What do you have to say?

23. Muithera: I didn't hear what Taiva said, (class laughter)

24. Lydia: I doubt! (class laughter) Did you hear Kanini?

25. Kanini: No.

26. Lydia: Taiva, you have to speak louder.

27. Taiva: (Inaudible)

28. Lydia: Did you hear Kanini?

29. Kanini: No.

30. Lydia: OK. Since she can't speak up, I will repeat for her (class laughter; Mona claps hands to get Lydia's attention, but Lydia seems to ignore her) She says that another difference is that when the frog, when it goes on land, it uses lungs to breathe. When it comes back to water it uses gills. Yes, Mona?

31. Mona: But did we finish - movement? I thought - well I was going to say that the frog uses - the adult frog uses all four limbs while

the young uses the front limbs and tail to swim. Now I will say (class laughter) that the breathing is by lungs with adult on land and by gills in the young and adult in water.

32. Lydia: Who says yes?

33. Students: (Silent)

34. Lydia: OK who says no? And why should you say no? Sheila?

35. Sheila: For the adult frog, it moves out of the water and breathes all the time with the lungs then it goes back to water until it needs to breathe again. So it does not have the gills.

36. Lydia: It keeps moving outside the water?

37. Sheila: Yes. And it takes in air- it gulps and the throat moves up and down (class laughter as Sheila demonstrates movement with her throat)

38. Lydia: I hope you people have taken trouble to observe this. What you actually observe is that the frog sticks up its mouth to the top of the water to gulp in air so that it opens the mouth up and down just above the water. Yes Grace?

39. Grace: (laughing) I was going to say that if it had gills it would have no need to come out of the water to gulp in air.

40. Lydia: Yes. It wouldn't need to come out. It would stay permanently in the water. How many people have observed this phenomena? That it sticks out its mouth to gulp air and goes back into the water? Have you observed that?

41. Students: Yes!!

42. Lydia: Yes - Muithera. What is your question? Your hand has been up for sometime. (Class laughter)

43. Muithera: The young has got a smaller mouth than the adult.

44. Lydia: (Smiling) I see. The young has a smaller mouth than the adult. Now how can we look at that? I don't know about that. (class laughter) But - size - size - OK. I think it is a point. Size, size, size. Do you mean how wide the mouth opens? The adult mouth opens very wide. (Class laughter) Is it?

45. Students: Yes!!

46. Lydia: Observe that in the tank and discuss it among yourselves then we shall - we can elaborate. Yes? (to Dina who has her hand up)

47. Dina: Ah! No. Not anymore (Muithera stands up)

48. Muithera: Uh. Another difference which we observe in the adult and not in the tadpole is that one has a much - a much slimer [slimier] skin - very slimy than the other.

49: Lydia: Smooth? (with disbelief in her tone)

50. Dina: Slimer [slimier] (laughing)

51. Lydia: Which one is which? Which one? Muithera, which one? Do you want to elaborate?

52: Muithera: The adult has a rough but slimy skin and the tadpole also has a smooth, but its slimer [slimier]. It is kind of ugly - brownish colour.

53. Lydia: Which is it, slimer, or slimier? (Class laughter due to pronounciation)

54. Grace: The slimier (laughing)

55. Muithera: The tadpole, I think.

56. Lydia: Observe. You can try to touch them. Be careful. But we are not children. We can observe without fear. Anybody with more important points?

57. Grace: The colour.

58. Lydia: The colour? No. I think we will pause here. Write these notes in your books first.

Once again, Lydia would have been jotting on the board, points made as the discussion progressed. She had actually put on the BB two columns; one headed, "Adult" and the other "Young". As might be expected, there would not be that many points under each column, and in fact, there were only six points; habitat, movement - webs - limbs - tail, breathing and skin. As in all episodes similar to this one, students would have had their notebooks closed, pens down while they listened in order to answer questions and contribute to the evolving classroom discussion. This particular sequence of techniques, namely: teacher's exposition intermingled with student answers; and teacher's assessment of understanding, often worked extremely well. However, the assessment of student understanding sometimes, resulted in confusion for both Lydia and students, occasioning severe intellectual distress to Lydia. Lydia would ask what she referred to as a simple assessment question, only to be bombarded with confusion, incomplete and inaccurate answers. This to Lydia was the most disorientating aspect of classroom teaching.

Its effect on Lydia should be seen in the perspective of three related characteristics of Lydia's beliefs about her knowledge of biology, her evolved instructional strategy and perception of the intellectual abilities of her students.

First, Lydia had said that she knew her subject well. Evidence of what Lydia meant by "knowing the subject well" can be gleaned from the fact that out of 78 lessons observed, Lydia had a 'paper' lesson plan on only 2 occasions. On the first occasion, the lesson plan contained the major points of errors made by students on a test. On the second occasion, Lydia had been expected to attend a meeting and anticipating that she would not come to teach, she had prepared instructions for the class monitor to pass on to the class. Lydia was rarely observed to consult a textbook before class and did not refer to one during teaching. From Lydia's school-wide responsibilities, her weekly teaching load of 25 hours, her personal and social responsibilities as a wife and a mother and her general approach toward new knowledge, it was inconceivable that Lydia crammed her 'research' class lessons before hand. The flow of content was too natural and the sequence too logical to be a reproduction from recent memory work. Lydia was observed to lose the thread of content during a lesson on only one occassion when a teacher from a nearby school had interrupted her lesson to give Lydia a basket full of live cockroaches. When Lydia had returned to the class after 5 minutes, she had asked the class, "Where did we stop?". The simplest explanation to Lydia's non-use of a paper lesson and her logical and sequential delivery of content was that Lydia just knew her stuff.

Lydia's logical sequence of content delivery was all the more astounding since, as will be described later, she had to break up each lesson into several instructional episodes. But it was precisely this thorough knowledge of biology concepts, that made it difficult and almost unbearable for Lydia to come to grips with student failure to grasp what she thought were simple biological concepts. In a word, Lydia expected that when she delivered content in an authoritative, logical and sequential manner, students would learn that content in exactly the same way. Lydia saw her logical instruction as leading to logical learning and logical understanding and achievement on any kind of evaluative device. By asking what she referred to as "simple assessment questions" Lydia was looking for and expected simple logical answers. Instead, Lydia sometimes found large gaps between what she expected and the actual knowledge of her students.

Second, Lydia believed that she had evolved a more or less perfect instructional strategy. Lydia had stated that with 10 years of teaching experience she had come to "know" what sequence of presenting information was best for most students. Lydia had a comprehensive concept of her overall teaching strategy as capable of providing for all student needs. She therefore, could not envisage how students could fail to learn simple concepts under such a workable instructional strategy.

Third, Lydia, as earlier pointed out, believed that all her students except one or two were bright and intelligent and she had very high expectations for them. She believed that they could do the work. Because of these beliefs, Lydia became very distressed whenever things did not go right. But how did Lydia deal with the problem? The events surrounding the construction of a definition of the endorperm by students, illustrate both Lydia's distress and her techniques of dealing with gaps in student knowledge.

Whenever a student's answers to "a simple question" were muddled, Lydia's first reaction was to ask a simpler question. If the ensuing answer was also muddled or incorrect, Lydia would then ask progressively simpler questions until such questions became quite trivial. But often this would not clarify the original confusion. Lydia would then select a certain point in content and launch a long winded, but perfectly logical and rational explanation, only to find at the end of it all, that the confusion had still not been clarified. At this point, Lydia, once explained after such a lesson, "I felt discouraged. I did not know what to do. I wanted to find someone to try to explain to the students - because I had failed. Because it now looked too difficult. I thought I had exhausted the possible examples".

The Case of The 'Invisible' Endosperm

It will be instructive to review one of these problematic teaching episodes so as to get a glimpse of the difficulties faced by both Lydia and students. During two separate lessons, Lydia had described the structure of both mono-cotyledonous and di-cotyledonous plant seeds, as preparation for a practical study of the conditions necessary for germination. During these two lessons, Lydia had stressed three points:

1. All seeds have at least one cotyledon in which food for germination is stored.
2. Some seeds have two cotyledons while other seeds have one cotyledon. A bean seed and a maize grain were given as examples of each respectively.
3. Some seeds have an endosperm which stores food and which is used for germination. A maize grain was given as an example.

Before the following 80 minute period, Lydia had explained to the researcher that she intended to review "briefly" the structure of seeds and then go on to have students set up three experiments and their controls in order to investigate the conditions required for germination. At the beginning of the lesson, Lydia had asked the students to name the structures in a seed, that play a role in germination. In response, Mona had named the endosperm and stated, to Lydia's horror, that its purpose was to act as a cotyledon. The following exchange of questions and answers then ensued.

01. Mona: There is also the endosperm.

02. Lydia: What is its role?

03. Mona: It acts as a cotyledon in a seed.

04. Lydia: What do you mean? What is this acting?(with disbelief in tone)

05. Janet: The endosperm becomes the cotyledons when they are not there or when they are finished. (laughter from class)

06. Lydia: Now, now, what is an endosperm?

07. Muithera: It is a structure in a mono-cotyledonous seed which stores food.

08. Lydia: Really? Someone else? Yes, Joy?

09. Joy: It is a structure in a seed which stores food in the absence of a cotyledon.

10. Lydia: No! Sheila?

11. Sheila: It is the second cotyledon storing food in a mono-cotyledonous seed.

12. Anne: It is a structure that protects the stored food in a seed. (Class laughter)

13. Lydia: No! No! Somebody please!

14. Lillian: It is an invisible food storage organ which is located outside the cotyledonous seeds.

15. Mona: I know now. Once you have cotyledons, you can't have endosperm, because once you have endosperm you don't need cotyledons; like in maize, there is no cotyledon, but there is endosperm.

16. Lydia: But we said that all seeds, all seeds (much emphasis and desperation in tone) must have one or two cotyledons, to be called a seed.

17. Mona: Exactly. That is why the maize is not a seed. It is a grain. It has no cotyledons.

Lydia had looked increasingly desperate as the above answers were being generated by students. It was of course, quite amazing that students had, over only two weeks, managed to accumulate a series of minor but significant misconceptions about the basic structure of seeds, leading one to wonder as to the quantity of misconceptions they are likely to accumulate in four years of learning biology. Evidently, among this group of 40 bright students, no one - at least among those who spoke and who were normally the most vocal and accurate - had understood the concept of an endosperm. Was the concept so complex as to present insurmountable intellectual problems in student understanding?[2]

The confusion and misconceptions displayed by students in Lydia's classes were all the more puzzling since students had spent at least 40 minutes observing the bean seed and maize grain, in order to identify various structures. They had made large and correct diagrams of the structures ostensibly, observed. Where then could they have gone wrong? First, the "seed" component of the maize grain, as in all mono-cotyledonous grains, is extremely small . The greatest part of the grain consists of a whitish substance, which students had crushed in order to get a powder, which they had used to test for the presence of starch. But students had not realized that this white substance was not enclosed inside a seed coat but rather a fruit pericarp. Second, in defining and describing the concept of an endosperm, Lydia had left out one key word, ADDITIONAL, to characterize both the endosperm's spatial location and function. The endosperm is not a structure like a plumule or a radicle or a cotyledon or a testa, which can be removed and inspected independent of the 'food'. The endosperm is simply an additional quantity of food in a grain or seed which, in a grain, is stored outside the seed but inside the pericarp; while in a seed, it is stored outside the cotyledons but inside the testa. Student misconceptions resulted from their failure to find a "structure" which was or in which was the endosperm. Therefore, they had invented one.

Student Questions

Quite often, students would want to pose their own questions during exposition and building of lessons; and since Lydia believed that it was important to exhaust all students questions before carrying on with the rest of the lesson, Lydia would often be drawn into digressions, of varying magnitude, from the concepts under discussion, as was observed in 22 out of 78 lessons. In attempting to answer each question to satisfy the individual student, Lydia would use two procedures. She would as a rule, answer those questions which she judged as relevant to the topic at hand. But whenever a question was posed which Lydia judged as either totally irrelevant or marginally relevant to the topic at hand, she would either, attempt to answer it by showing its links, however extraneous they may be, to the topic under discussion; or more often, Lydia would put the question to the floor. In this fashion, as various students attempted to find "the answer" every succeeding answer or opinion would lead to further digression and more questions, generating a wide array of differing opinions, hypotheses, pure conjecture, and a great deal of fun for students. Lydia rarely made an effort to pull these diverse views into some sort of discernable summary or conclusion. She would keep the various answers and points of view hanging in the air with a simple and cool comment, "You think so? Alright!" But she always closed off the episode by the expression, "Let me make one important point clear", and invariably this "important point" would refer to the correct biological concept that had originally opened the door to the digressing questions. It did not seem to matter to Lydia that this "important point" might make no reference whatsoever, to either the digressing questions or the various student points of view regarding their questions.

Student Note-taking and Teacher Monitoring

Once Lydia had exhausted her own and student questions, and if she felt satisfied that she had corrected the various misconceptions, she would then allow students to make their own notes on the concepts she had talked about. Lydia believed that note-taking by students was an important component of learning biology. Therefore, right from the first biology lesson, first formers had been instructed to make their own notes. Lydia, as earlier stated, discouraged students from "taking" notes while she talked, explaining, "my belief is that if a student at this level, is thinking of what to write next, they won't pay sufficient attention to what you are saying, so that they will miss the next point and so on." But Lydia did not just give students time to make their own notes, she also monitored notes-writing, going from student to student, reading the notes, pointing out omissions and consistently insisting on writing correct and complete grammatical sentences. She also used her tours to answer individual questions as long as students raised their hands. During these monitoring episodes, Lydia rarely looked at work done previously, perhaps because there was no real need since she would have monitored its construction in earlier lessons. She spoke very quietly to each student, so that it was almost impossible for a classroom observer to pick up the dialogue between Lydia and individual students. Lydia was aware that some students took better notes than others; so she often collected the notebooks at the end of the lesson or after evening prep, in order to mark them and award marks. Lydia said that marking notes and awarding grades, "keeps the student alert and it is an incentive to improve. " Asked whether or not she might not give full marks to someone who had simply copied the notes from a textbook, Lydia explained that it would be difficult for a student to copy notes in a format and language which would indicate individuality. Lydia further, pointed out that since she knew the depth at which she had dealt with various concepts in class, notes copied from a textbook would not be at that exact depth. Consequently during marking notes, Lydia was not only looking for correctness of concepts expressed by individual students, but she also considered depth and individual formats and styles.

But it was also during the monitoring of student note-making, that Lydia often implemented two other techniques basic to her instructional strategy and which derived from her beliefs, namely, that students had to be taught to be conscious of the use of time and its value in learning; and that in the classroom, she was the chief repository and resource of accurate information. In the first

first instance, Lydia often publicly allocated a definite number of minutes for note-writing; 5 minutes or a few minutes. As she went around monitoring work, she would continuously ask, "how many people have not finished?" Students who had not finished would put up one hand while they kept on writing. Lydia demanded that those who had finished note-taking should sit up, pens down with head and eyes forward. This conscious and constant reference to time was another source of conflict for Lydia, since she had problems balancing time needs among those who were fast and those who were slow. Lydia said that in the end, it was the slow students for whom she compromised by waiting until everyone had finished. As a result, Lydia's lessons were characterized by student fidgeting, dropping of rulers, screeching stools, shuffling pages in files and yawning. Lydia knew these signs as symptoms of boredom by those who had completed their work, but she decided not to seek to change her strategies to cater to them because, "when I start on something new, the students who have not finished will try to finish while I talk, and I am sure I will lose them". This concern for the individual student was also extended to the fact that Lydia rarely gave public praise. Despite intense individual monitoring of work, Lydia rarely praised students either as reinforcement for correct responses or for doing outstanding work as individuals or as a group. Lydia's opinion on the issue was, "I don't want to give them a complex".

In the second instance, with regard to Lydia's emphasis on being the most accurate source of information, Lydia was observed to get very upset if students whispered among each other during note-taking. Lydia had explained, "I hate whispering. It irritates me. When a student doesn't understand, instead of asking me, she whispers to her neighbour. My fear is that they may give each other wrong information and I won't know about it." At first, Lydia's annoyance had proved to be quite puzzling to the researcher especially since during practical work, students talked among each other loudly and Lydia tolerated this high level of noise. The point was however, that talking during practical work was just verbal talk, confined to students negotiating among themselves for space, resources and even strategies of approach and procedures. Such talk and discussion did not result in immediate written work. Whispering during note-taking however, was tantamount to seeking information to write down as a permanent record of what had been learned. Lydia knew that classroom notes formed the backbone of the conceptual knowledge from which students would revise in later years and therefore, notes had to be correct. If any student had doubts, Lydia was the final arbitor. For example, during note-writing in one lesson Lydia was answering a question by Grace which took some three minutes. In between, Wanjiku had had her hand up for sometime. Looking back at Grace's place, Wanjiku saw that Lydia was still busy and decided to talk to her neighbour, Sheila. When Lydia had finally reached Wanjiku's place, Wanjiku had shot up her arm and Lydia had commented, "I thought you had decided to ask Sheila". Wanjiku had replied, "Yes. But she was not sure of what she told me". Lydia had then exclaimed, "She was not sure! But why disturb her in the first place? What is it you wanted to know?" Lydia's definite dislike of classroom whispering during note writing was further indicated by the fact it was the only misbehaviour for which she sought out and named 3 students publicly during class and then punished them after class.

Setting up Lab for Practical Work

Perhaps, one of the most interesting aspect of Lydia's instructional strategy was the way she incorporated setting-up lab with monitoring the progress of student work. On one hand, if Lydia evaluated student understanding or progress of note-writing and judged their status as unsatisfactory, she would continue to remedy these specific situations and more or less abandon part of her mental lesson plan, including a proposed practical. On the other hand, if she judged such progress to be to her expectations, then she would continue with the lesson as she had mentally prepared it, and begin to arrange the resources and materials for subsequent practical work. Lydia normally gave a verbal statement to Julian, the technician, as to what materials, equipment and specimen might or would be needed. Sometimes, but not often, Lydia might scribble a list of the measurements and numbers needed, but in general, Julian also 'knew by heart' what was required for different practicals without much prescription by the teacher. The required materials would usually all remain assembled in the prep room; sometimes some of it might be brought into the lab at the teacher's desk - but rarely was the lab ever set per student or groups of students location by location. As she went around monitoring student work, Lydia would also assess the feasibility of carrying out the practical work. Consequently, some of the time taken by students in making their notes made it possible for Lydia to "catch up" on setting up lab. Lydia would keep moving from the main laboratory to the prep room to give fresh instructions to the technician regarding what specimen or equipment would really be used that day. This meant that lab setting up was always done in an incremental fashion, even for students who eventually would have to move back and forth between their locations and the teacher's bench in order to collect what they required.

Student Practical Work

Procedural instructions for experimental or observational work were always written on the blackboard and "gone over" by Lydia. This meant that whenever students were finally "released" to do the practical, there would be a surge to the front desk to collect specimen and equipment. If the practical was experimental there was always enough equipment for 8 to10 groups of 5 or 4 students each. If the specimen were for observation there were always more than enough for individual students, even though at times, exchange among students of different specimen, such as bones, might be required . An observer's first impression of Lydia's practical portion of the lesson was that of a chaotic bunch of fussy students, with a very high noise level, a lot of shuffling and moving about, all of which appeared to be out of control. However, soon the observer would learn that these periods of apparent 'disorganized chaos' were purposely structured and encouraged by Lydia and that she, in fact, kept a high level of control through various non-verbal cues and physical monitoring. The most important of these cues was a concentrated, penetrating look which when directed at a student or a group, instantly worked by reducing the noise, getting students to shu - shu until the whole class realized that they had exceeded the acceptable noise level. Another mechanism of control was the "amorphous group". Lydia did not have defined groups and sometimes as many as 15 groups would form, when Lydia's stated prescription had been for 8 groups. But once again

Lydia's belief in individuality and the need to encourage interaction among pupils as long as they were doing something, prevented her from curtailing multiple group proliferation. Therefore, a group may have one person - two, four or six students. And as long as Lydia judged, through her comprehensive monitoring system, that all students were doing work she made no attempt to intervene, precisely because the large number of groups also enabled Lydia to keep track of individuals and their progress on various tasks.

Summary

Lydia's instructional strategy consisted of a cyclic reproduction of four major techniques, teacher verbal exposition and assessment of understanding; student note-taking; teacher monitoring of work progress and setting up lab; and student practical work. Practical work was normally followed by another episode of student note-writing. Throughout the instructional strategy, Lydia would strive whenever possible, to implement techniques such as, exhaustively dealing with each student's questions, monitoring individual work particularly, note-taking, and allowing the devolution of numerous groups during practical activity, in order to cater to student individuality. These techniques nurtured a relaxed atmosphere in the classroom which allowed the development of a certain amount of control of classroom events by students. This is the subject of the next chapter.

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[1] The outline was copied from the blackboard in its exact format. The solid lines across the page merely represent separation of colums on the blackboard.

[2] The concept of the endosperm was also misunderstood by equally bright students, in two other research classes.

Chapter 3

A CLASS GONE AWRY

"Those girls read very much and
they know what to ask, and I
learn a lot from what they ask;
because then the teacher can
explain things she had forgotten
to talk about before." Student (1984)

Introduction

Traditional descriptions of the teaching-learning process often portray students as either passive recipients of information, content and directives from the teacher, or as active in terms of their carrying out various tasks, assigned to fulfill objectives designed by the teacher. In either case, the teacher is seen as the dominant player, structuring both content and rules of behaviour for the students. More recent studies of how teachers and students live out their daily lives in school have however, pointed to the fact that two types of activities exist in classrooms: formal events (labelled as instruction); and informal events in which all other events in which learning is a means of giving and obtaining information. Griffin (1977) suggests that conclusions about research results of instruction which do not take account of both formal and informal activities may be misleading. And as Green and Harker(1982) suggest, since students acquire knowledge of social and communicative strategies needed to gain access to the academic content of lessons simultaneously with the academic content, students must therefore, be responsible for a substantial part of the structuring of classroom dialogue and events.

This chapter examines the participation of students in Lydia's lessons from the general thesis that (1) the public school classroom defines an ecological niche which must be adapted to by both teachers and students in order to construct meaningful learning experience; (2) the adaptive apparatus of many students is designed from contexts in and outside the classroom; and (3) mastering a specific set of rules for speaking is vital to this survival (Smith 1973).

Findings from studies which have attempt to understand the causes of problems that arise during the teaching-learning process, such that teachers find it difficult to teach and students are unable to learn, have suggested that students, for various reasons, had developed behaviours that resulted in opposition and resistance to being taught (Aronowitz and Giroux 1985, p. 72). However, it would seem from observations in Lydia's class that not all students consciously develop and act overtly through oppositional behaviours in attempting to construct sense and meaning in their classroom experience. In this chapter, the 'historical' development and composition of a group of students referred to as the 'backbenchers' in Lydia's class is described. The 'backbenchers' came to not only dominate participation in classroom dialogue, and thus control a large portion of classroom events, but also to control the behaviour of the teacher and other students- the 'frontbenchers' and 'midbenchers'- and ultimately, brought about a certain kind of individual and group freedom and ease in the teaching-learning atmosphere which probably encouraged more understanding of biology by students than would have otherwise been the case.

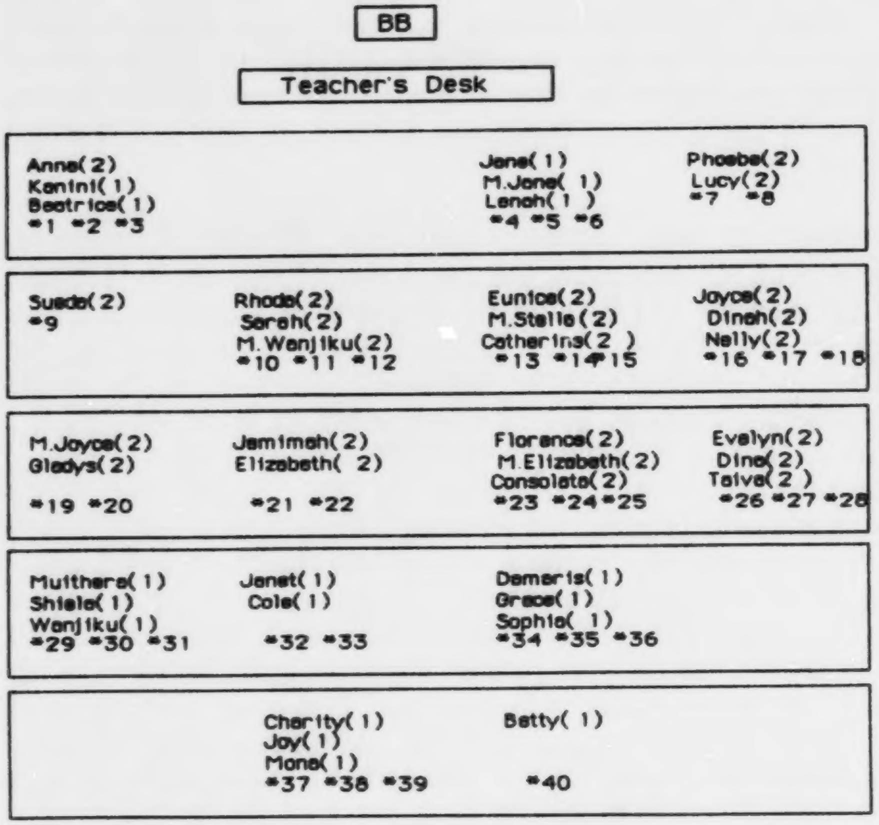
Origin of 'Backbenchers'

National High as earlier indicated, was a government assisted school where students, from all over the country, who completed their primary education with top scores were admitted. The researcher was present as 40 students entered and took seats for their first lessons in biology at secondary school in January 1983. During the first three lessons, students took up seats as shown in Chart 2.

It is clear from the chart that during the first three biology lessons, and subsequently, students who had attended urban primary schools tended to congregate and sit separately from students who had attended rural primary schools. There were two exceptions, as can be seen from the chart, in the cases of Catherine (1) in location 15 and Anna (2) in location1. Since in this class there were no two students who had attended the same primary school, how did the students arrive at this sitting pattern? It was quite possible that the laboratory sitting pattern was purely by chance although more or less the same pattern had evolvedin the classroom, where seats had been similarly, self-assigned.

While it was not been possible to ascertain all the factors and processes that had probably brought about the seating pattern of students, three elements, namely, location of primary schools attended, fluency in language, and differential material possessions would seem to have been important reference points in grouping students. It is reasonable to argue that friends sat together, but such friendships had to have been formed within the first week of school during orientation week. But it was clear from the nature of student participation in the first three lessons, that about 15 students, all of whom had attended urban primary schools, and who had a very good command of oral English skills in comparison to the rest of the class, were more vocal. Any discussion of skilled performance in classroom events usually includes speaking (Cadzen 1971) and indeed, the school head and teachers were well aware of the disparities in language skills that different students possessed, especially between students who had

Chart 2: Student's Self-Selected Seating - January 1983


BB
Teacher's Desk
Anne(2)
Kanini(1)
Beatrice(1)
*1 *2 *3
Jane(1)
M.Jane(1)
Lenah(1)
*4 *5 *6
Phoebe(2)
Lucy(2)
*7 *8
Sueda(2)
*9
Rhoda(2)
Sarah(2)
M.Wanjiku(2)
*10 *11 *12
Eunice(2)
M.Stella(2)
Catherine(2)
*13 *14 *15
Joyce(2)
Dinah(2)
Nelly(2)
*16 *17 *18
M.Joyce(2)
Gladys(2)
*19 *20
Jemimah(2)
Elizabeth(2)
*21 *22
Florence(2)
M.Elizabeth(2)
Consolata(2)
*23 *24 *25
Evelyn(2)
Dina(2)
Taiva(2)
*26 *27 *28
Muithera(1)
Shiela(1)
Wanjiku(1)
*29 *30 *31
Janet(1)
Cole(1)
*32 *33
Damaris(1)
Grace(1)
Sophia(1)
*34 *35 *36
Charity(1)
Joy(1)
Mona(1)
*37 *38 *39
Betty(1)
*40

Legend:
(1) Student attended city or urban primary school.
(2) Student attended rural primary school.
* Location of students' places.

formerly attended primary schools in the city or large urban centres, and those who had attended rural primary schools. For students in city and large urban centres, English is not only the medium of instruction from pre-school to the end of primary school but also for many children, English is spoken at home and during many other activities such as church services, shopping, and sports. For rural students however, English might not become a medium of instruction until the last 3 standards of the primary school and very rarely, is it the language of the home or other community activities. The school's management believed that the language disparities between various new students and their experiences and familiarity "with large places" meant that, "the urban girls don't need much guidance during orientation week. They have no problem finding their way around. If they don't know something they will ask. The rural girls however, need time to gain the confidence and practice of having to ask for everything in English".

Furthermore, it was evident that the differential material possessions of students from the two types of environments might have also had some influence. At the beginning of the term, students had not yet been fitted with a uniform, and it was observed, for instance, that students who occupied locations 1 to 6-the 'frontbenchers'- although well dressed, were in moderate fashion. Location 29 to 40 were occupied by expensively dressed students, - the 'backbenchers'- with expensive watches, shoes, and fancy apparatus and bags for carrying learning tools and books. While both 'frontbenchers' and 'backbenchers' had an appearance of being well-fed, and cared for, the 'backbenchers' also displayed all the trappings of an urban style and fashion: pierced ears, well shaped nails and carefully tended hair. It was further observed that the same group tended to have more textbooks of their own than other students, plus other luxuries such as hand gloves and overcoats (during the cold season) pocket radios and stereos, and perpetual supplies of sweets and chocolate. Students occupying locations 7 to 28, tended to have few paraphernalia suggestive of an affluent background; many had very short cropped hair and were dressed in uniforms of their former primary school. When the class had settled down, the 'midbenchers' had sat either silently or had held whispered conversations with each other, unlike the 'front and backbenchers' who tended to hold loud conversation while waiting for the teacher to arrive.

The pattern of sitting shown in Chart 1, did not change considerably throughout the 3 years of observation. The notable changes were three: Cole (1) left location 33 to sit next to Seuda (2) at location 9; Janet(1) and Damaris(1) left location 32 and 34 respectively, to move next to Betty in location 40. But these changes in location still fitted into the general seating pattern according to fluency of oral English skills. Apart from these three changes, there were changes of locations across the same bench, but not from bench to bench. These seating patterns have been emphasized, because they were observed to materially determined the subsequent patterns of student participation in learning which developed during biology lessons.

The Social Context of the Classroom

Recent research using micro-ethnography has viewed the teaching and learning of academic content as embedded in and influenced by social processes since the social context in which an academic activity occurs affects the nature of the learning processes used and the nature of observed student performance (Bloome and Green 1982). For example, Bloome (1981) in order to study reading adequately in junior high schools, had to expand the definition of learning reading in classrooms, to include a variety of forms, modes, settings, social organizations and group formations. Concern with the kinds of social, communicative and cognitive opportunities the social context of classroom literary events provide for student interations with printed texts, has led Bloome to consider the notion of the invisibility of cultural diversity among students and its relationship to the distribution of learning opportunities among class members. Bloome has argued that students access to opportunity to participate in learning in group situations is guided by what McDermont (1977) has described as their ability to establish a working consensus to an event. Students have a shared sense of what is happening, the purposes of the event and the shared sense of the content and structure of the event. But Bloome cautions that 'sharedness' should not be equated with 'equally shared' or with 'similarly shared' since within interactional events, participants assume and are assigned roles within the event (Bloome 1984). Similarly, Green and Smith (1983) have considered learning as a cognitive, linguistic and social process to which participants bring a frame of reference, that is, participants have a set of general expectations for what will occur. However, the specific rules or expectations for performance are signalled by the participants as they work together and build on each other's messages and behaviours in order to construct the activity and reach the instructional goal.

The physical and social contexts which were constructed by the three major categories of students in Lydia's class, namely, the 'frontbenchers', the 'midbenchers' and the 'backbenchers' were observed to be a critical reference point to students during learning, particularly in setting up the structures of certain classroom events; in assigning participation roles; in defining characteristics of a working consensus, and in distributing learning opportunities among class members. Students participation in making sense of procedural instructions, setting the pace for the delivery of content, and signalling activity for the change of activity, were evidence of how the three major categories of students in Lydia's class, using their physical locations and different oral fluency, constructed a social context for their participation in various events and processes of learning biology

Making Sense of Procedural Instructions

Procedural instructions for practical work were always written in shorthand on the blackboard and questions about them clarified by Lydia before setting the students loose to tackle the practical. Student participation in biology practicals was characterized by the following elements:

1. There was open competition between individuals and among groups for doing practical work.

2. The 'midbenchers' tended to adhere strictly to the size of groups prescribed by the teacher while the ' front and backbenchers' tended to want to work alone or in groups of two or three and not in groups of 7 or 8 as often stated by Lydia.

3. During practical work, the 'frontbenchers' (6 students) the 'mid-benchers (22 students) and the 'backbenchers (12 students), would form at least, 2, 3 and 6 groups respectively, so that it was usual to observe as many 12 to 15 groups unless learning resources were so restricted as to make sharing an absolute necessity.

4. Even with proliferation of more groups, the original sitting pattern

remained a significant feature of student self re-organization and assignment to groups.

How did the students actually proceed with the practical work? In certain aspects, student practical sessions were uneventful. First, students in groups used the most straightforward manner to make sense of instructions and the requirements of various tasks. If they did not understand something, they first held discussion among themselves. If they failed to arrive at a solution that satisfied everyone, they would raise their hands in order to seek clarification from Lydia. In other words, a fundamental learning and participation strategy in this class was that students concurred with Lydia's belief that she was the final resource, and they used this resource effectively.

Strategies for Setting the Pace of Learning

Student in-group discussions regarding procedural instructions often turned into debate especially among the 'front and backbenchers' and Lydia would often be called in to arbitrate. This meant that from a numerical perspective, there were many more demands and requests for explanation and clarification originating from the 'front and backbenchers' than from the rest of the class. The fluency in oral language skills of the 'backbenchers' in particular, was a key factor in their claiming a disproportionate amount of Lydia's attention. First, the "backbenchers" were fluent and confident enough right from the first lesson in Form 1, so that whenever they asked a question Lydia seemed to immediately understand their problem. Second, unlike speakers from the 'midbenchers', backbenchers' were always audible. They had an 'I don't care attitude' and whether or not they thought they were correct, they were prepared to speak out. The fluency of the 'backbenchers' coupled with their eagerness and competetiveness in carrying out tasks such as, moving about to collect specimen, setting up apparatus, observing, challenging one another, exchanging specimen, and setting up individual working stations at side benches, resulted in practical sessions that appeared and sounded chaotic with a high level of noise. But Lydia tolerated all this, as long as she judged that students were discussing classwork.

It was essentially through the confidence and fluency in oral skills of the 'backbenchers' that they came to control a great part of the events in Lydia's instructional strategy. But the 'backbenchers' were not simply fluent in English, but also their accents were variously anglicized, giving the impression to the 'midbenchers', that the latters' accents were appropriate for communication in the classroom. Consequently, the 'backbenchers' became a model for communication and dress both of which others in class strove to emulate and did in fact, copy.[1] The 'midbenchers' needed and in fact, took some time to 'learn' to angelicize their accents sufficiently, before they could feel confident enough to ask questions and join in the general dialogue and debate in the classroom. But by that time, the 'backbenchers had become so proficient in negotiating access to various classroom aspects of dialogue and activities that a permanent gap more or less had been created between the three sections of the class. Ultimately, the 'backbenchers' came to excercise various overt and subtle mechanisms of control over the pacing of content and the emphasis given to various classroom tasks.

Lydia's emphasis on giving a chance to the individual student, initially gave plenty of practice to the 'backbenchers' to ask questions and to answer Lydia's questions. Very early in the year therefore, the 'backbenchers' established themselves as a dominant group both in the eyes of Lydia as well as in the perception of their classmates. And since Lydia saw the capacity and frequency of student ability to pose questions as a useful way to gauge both student participation in learning and their understanding of various concepts, she gladly encouraged it. Later, as students became fully conversant with the school's rules concerning the teaching-learning process, they found that Lydia's instructional strategy, which was made up of giving a short exposition followed by assessing understanding through questions and then note-writing, worked to the advantage of students with enough confidence to contribute to classroom debate in the following ways:

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[1] Evidence that such emulation was taken seriously, was observed in activities such as the growing of long hair and wearing of scarfs and book bags by the 'middle benchers'. Similarly, when students were asked to list the names of five students who were considered most popular and state why, all 'middle benchers' and many, but all 'front and back benchers' named Muithera, Mona, Shiela, Charity and Cole. These students were described as, "Elegant, ladylike, speak nicely and are smart. These five together with Joy, Grace and Damaris, who were also named by some students, had the most angelicized accents and were the most confident and vocal in class.

First, as earlier pointed out, Lydia wanted to encourage a certain amount of individualism and creativity among students. Therefore, her emphasis on giving a chance to students to ask questions initially benefitted mostly the 'backbenchers' who were confident enough to ask questions and contribute to classroom dialogue. By the end of first term, the 'backbenchers' had established themselves as a dominant group of participants on whom Lydia relied to operationalize her goals. Second, Lydia generally, regarded student capability to ask questions as a useful and logical way in which to gauge both student participation in learning and understanding of various concepts. She therefore, gladly encouraged those students who would provide data for her mental evaluation of the effectivieness of her instructional techniques. In the process, she provided plenty of opportunity to the 'backbenchers' not only to practice asking and answering questions but also to learn Lydia's responses to various student responses, reactions and interactions in such episodes. Third, as students became conversant with Lydia's expectations of them, and were able to 'read' the nuances in Lydia's reactions to contributions initiated by students, Lydia's own instructional strategy worked to the advantage of the fluent and confident 'backbenchers' at two lelvels. In the first instance, students who were more fluent in the language skills were likely to get more out of the lecture exposition episodes than less fluent students. In turn, the fluent students tended to write more detailed notes than their less fluent colleagues. Lydia did not want to begin a new lesson episode or activity until she had given plenty of time to what she thought were slow writers, a chance to complete note-writing. In actual fact, the fluent writers tended to ask more questions in order to have the blackboard notes clarified by Lydia, and would then write longer texts than the rest of the class. Lydia tended to believe that she was waiting for slow writers when in fact, she was unwittingly, waiting for the more fluent students. Therefore, the fidgeting, shuffling of books, and boredom characteristic among the ' front and midbenchers' was not observed among the 'backbenchers' because the 'backbechers' always set the pace for the sequencing and changing of classroom activity. In the second instance, the 'backbenchers' used their superior knowledge of the nuances of Lydia's reactions to students, in order to control the nature of activity during some lessons. As earlier mentioned, Lydia did not set up practical work until she was satisfied that all students had understood previous concepts and completed notes-making. By being able to control the pace of note-writing, 'backbenchers' effectively controlled the setting up of practical work.

Micro-level Control of Content Delivery

A sense of other subtle strategies for controlling classroom events which were excercised by the 'backbenchers' can be seen from three recurrent elements in Lydia's lessons, namely, dominating class consensus, pacing of content sequence, and the injection of laughter. These three elements are clearly illustrated by the lessons on *Digestion* and *Vertebrates* excerpts which have already been presented in Chapter 2.

With regard to dominating class consensus, control would occur at two levels. The 'backbenchers' would always give very strong 'Yes' or 'No'to Lydia's questions such as: "have you made the drawings?; or "you are familiar with HCl?". By dominating the class consensus, 'the backbenchers' would determine, to a large extent, Lydia's point of entry into a new lesson and her pace of delivering content. Yet the 'backbenchers' consensus did not always reflect the true status of progress and knowledge in the whole class. And this was partly the reason for the stark gaps in knowledge that Lydia frequently discovered whenever she attempted to assess student understanding and progress in a systematic manner.

The second subtle strategy of student influences on the pace of delivering content, namely moving, evaluating and pushing the lesson forward, was illustrated in the lesson on *Vertebrates* , as shown by the following excerpts taken from the longer segment quoted in Chapter 2.

10. Sophia: The adult, the young moves by gills. No, webs, the adult ? By Legs?

11. Lydia: ... Yes? You want to complete or someone to complete it for you?

12. Sophia: Someone else. (Class laughter)

13. Damaris: Has two legs.

15. Students: What? (Class laughter)

21. Taiva: (Inaudible)

31. Mona: But did we finish -movement? ...I was going to say that the frog uses ...Now I will say (class laughter) that...

39. Grace: (laughing) I was going to that if it had gills it would have no need to come out of water to gulp in air.

43. Muithera: The young has ...

47. Dina: Ah No. Not anymore.

48. Muithera: Ah, another difference which we observe...

There were four aspects in these student responses. First, students might move the lesson forward; second, they might point out incomplete treatment of content; third, they might allow the teacher to give access to dialogue to other students in the classroom; and fourth, students might point out some disparity between class social expectations and actual procedure. In the excerpt quoted above, Muithera and Taiva had moved the lesson forward - but at a point, judging from Lydia's reactions and dialogue, when she had not expected this pushing ahead. So in line 21 Taiva who had, by her looking through the window, suggested inattention to Lydia, comes out with a new point. But Lydia had decided to make an issue of Taiva's low voice. When Lydia stated that she would repeat what Taiva had said, Mona, feeling that Lydia had overdone that bit of the lesson, clapped her hands to suggest that 'it's about time to move on'. And after Mona had heard what Taiva had said, she had pointed out to

Lydia that the discussion on the movement of the frog had not been properly concluded. Mona had concluded that discussion and then advanced the lesson. Later in the segment, in line 39, Grace judging that Lydia was repeating what Sheila had exhausitively explained and demonstrated, jokingly pointed out the logic in the content that, "If it had gills it would have no need to come out of the water to gulp air." Similarly, Muithera appeared to have become tired of this point for some time (she had actually raised her hand as Sheila demonstrated the throat movements). But Lydia misinterprets the meaning of Muithera's hand. Believing that she has a burning question, Lydia calls on Muithera, only to discover that she simply wants to advance the lesson. And later on, when Muithera felt that Lydia had belaboured the "frog's mouth" issue, she stood up without being pointed to, and advanced the lesson again.

Third, coupled with this covert control of dialogue by students was the subtle role of whole-class and individual laughter. Most of the laughter, as can be expected, originated from the 'backbenchers'. The main function of laughter, besides it being indicative of the somewhat relaxed classroom atmosphere, was to point to various disparities between what some students expected and what was seen to transpire. In line 12, class laughter emphasized Sophia's admittance to 'intellectual defeat' by her inability to complete an answer. In line14, laughter underscored Damaris's conceptual ambiguity in talking about legs and limbs. In line 23, laughter affirmed agreement with Muithera's opinion that, 'some students speak too quietly' and in line 24, laughter was used to challenge Lydia's impending and unclarified opinion of doubt. In line 30, laughter reprimanded Taiva and Lydia for wasting class time by necessitating teacher repetition, and for waiting so long before doing something about Taiva's inaudible contribution respectively. Of course, there were incidences of laughter which were purely the result of humor as for example, laughter which accompanied Sheila's funny bobbing of her non-existent Adam's Apple to demonstrate how the frog gulps in air, and that which accompanied Lydia's statement about the width of a frog's mouth. This sort of laughter was more spontaneous, more wide spread throughout the class and lasted longer than the control laughter which was more localized, more meditated, contrived and was extinct as soon as its purpose had been indicated and in most cases, achieved.

Signalling Activity

An even more subtle mechanism than the those described above, used by students to control both Lydia's pace of delivering content and the activities accompanying such delivery, was observed to be implemented by the 'backbenchers' whenever, somewhere during an 80 minutes' lesson, they realized that Lydia intended to use the whole period for exposition and student note-taking. At the beginning of each term, there would be a more balanced mixture of teacher exposition, student note-writing and observation of specimen or experiments. But during the last few weeks of term, Lydia would come under pressure in order to "catch up with other streams." This would mean that Lydia would tend to give longer expositions consisting of bigger chunks of content which would require students to take longer periods in note-writing without any practical work. Increasingly, the 'backbenchers' had come to the conclusion that Lydia "gave too much information" and that student hands "got tired of writing" up to a certain point during the lesson. Slowly and consciously the 'backbenchers' had hatched, implemented and perfected an extremely effective control mechanism which utilized an ordinary classroom technique and by which Lydia herself assessed not only student participation in her lessons and their understanding of content, but also her own effectiveness as a good teacher. The strategy students adopted was one where they would seek as much information as possible from Lydia on a particular topic, concept or issue, in order to keep Lydia and themselves talking, debating, and hypothesizing, so that in the end, little time would be left for student note-writing. Students would ask questions.

If 'backbenchers' discovered after the first 40 minutes of the lesson that there would be no practicals, that is, when they observed that Lydia had made no effort to set up lab while she monitored their note-taking, they would start "palm braking" i.e. nodding their hands back and forth to indicate to each other that their hands were getting tired of writing. Soon questions would begin to be fired from the 'backbenchers'. These would be mostly very good questions, often insightful but invariably requiring Lydia to go beyond what she had planned or to clarify content she had already hurriedly taught. There would be many hands raised before the answers to any one question had been exhausted. During these 'question sessions' Lydia would almost helplessly fall prey to student engineered techniques, disgressing materially from her mental lesson plan; extending discussion to the whole group; throwing questions back and forth to the whole class; seeking as many interpretations of the same concept as possible; and giving alternative authoritative and conjectural explanations. The sum effect would be decisive; there would be little or no more note-writing.

It was not clear why students had chosen asking questions as their major strategy with which to control note-taking? However, it was likely that students realized that they could not simply refuse to write notes, claiming writer's cramp, since Lydia marked notes and awarded grades. Students must have also realized that they could not become simply unmanageable in class. After all, social and classroom discipline was not something any student intentionally messed with at National High. Perhaps, even more significant to students than fear of breaching social rules, was the fact that these students liked to learn, and they generally understood that they were in class to learn, and were not really interested in curtailing information for learning. Students were simply interested in reducing the amount of writing as a physical activity which tired their hands.

But 'backbenchers' also kept a sure but subtle control over the staging of the whole question strategy. Whenever they sensed that the strategy had become unproductive, they would strive to abort it. For instance, if a student asked a question which 'backbenchers' thought had already been asked and an adequate answer had been given, they would Aah!..Aah!, the student who was constructing the question before she had completed it. Lydia would in fact, unintentionally, aid students' Aah...Aah by asking, "does everyone know that?", whereby the 'backbenchers' would drown everyone else with a strong chorus of "YES". Similarly, whenever, 'backbenchers' thought that Lydia's answers and explanations to their questions had become trivial, they would once again, use their capacity to dominate class consensus to indicate their displeasure. For instance, during one episode, Lydia had been diverted by students into a question session, and believing that students might not have understood what the various parts of a seed grow into during germination, Lydia had asked the following questions which, as the excerpt clearly shows, 'backbenchers' had chorused to insignificance, steering the lesson back to a student engineered question session.

01. Lydia: What becomes of the cotyledons?
02. Chorus: They fall off.
03. Lydia: What becomes of the radicle?
04. Chorus: The root.
05. Lydia: And the plumule?
06. Chorus: The shoot
07. Lydia: What is a shoot?
08. Chorus: Oh - oh - oh - Now!
09. Lydia: No. No. I must ask. You don't seem to know these things.
10. Chorus: Yes. We know.
11. Lydia: You know?
12. Chorus: YESS!

Student Perceptions of Their Participation

StudentAwareness of Their Influence on Teaching

How aware were Lydia and students of these participatory techniques? It was confirmed through interviews and self reports that the 'backbenchers' were very much aware of the strategies they had invented to influence classroom events. They did not think or talk in terms of 'controlling' classroom events. They regarded their dialogue as simply participation. 'Backbenchers' said that their frequent laughter was because they found some of Lydia's questions, comments and reactions, "too much." A student had elaborated on this answer by stating, "it's to let her [Lydia] know that what she has asked or done is too funny". As to the purpose of the question sessions, 'backbenchers' had explained that they wanted to make sure that they would get as much clarification as possible before being asked to make notes. After a lesson which had been particularly plagued by question sessions, three 'backbenchers' had been interviewed regarding their very active participation in asking questions.

Janet and Wanjiku had pointed out that they needed to ask all their questions during class so that they can write the notes during prep time. Mona, who alone had asked 11 questions during the 80 minute lesson had commented, "so you noticed? Oh, but see how much I wrote today and see what I wrote the last time" (pointing to two paragraphs of that day's notes as compared to 5 pages of notes made during a previous lesson).

There was probably, a little bit of 'staging' in these question sessions during lessons observed by researchers, particularly, after students had discovered that researchers often noted the number of questions each student asked, and how students reacted to Lydia's responses. But some students would probably do this anyway, with or without observers since as has been observed by Anang and Lanier (1982), some students want their "performances" to be public either to show off their ability or to gain teacher and peer approval. In addition 17 students had stated that they thought that Lydia taught differently - better - when there were observers in her class. Kanini had once written in her self report, "when you [observers] are there, she acts sweet and smart". But even with these factors, 'backbenchers' were aware of their role in influencing classroom events. Similarly, the rest of the class saw both positive and negative elements about the role of the 'backbenchers' in determining classroom events. For example, Lenah, a fluent 'frontbencher' had characterized the 'backbenchers' as show-offs. Lenah had however, pointed out that Lydia often encouraged the 'backbenchers' to show off by what she described as, " the teacher does not explain the things you want; she asks students to explain." Phoebe, a 'middlebencher' had however, commented with reference to the 'backbenchers', "those girls read very much and they know what to ask, and I learn a lot from what they ask; because then the teacher can explain things she had forgotten to talk about before." It was clear that the question sessions served not only some student original purpose of curtailing student note-taking but also enhanced the effectiveness of the instructional strategy by forcing Lydia to clarify concepts and information.

Lydia did not admit to being aware of these particular control techniques by students. When at the end of the research, the possibility that the intense questioning technique might have been deliberate had been raised, Lydia had replied, "I doubt it. It is because they forget so much of what they have been taught, they keep on asking questions in order to remember and have matters clarified". Yet at another level, Lydia was aware of the subtle control mechanisms exerted on her by at least, a few 'backbenchers'. Lydia did not categorize her students publicly except for four students, Mona, Charity, Joy and Seuda. According to Lydia, Seuda -a 'midbencher- was a stubborn and disturbed child whose classwork in all subjects was poor and whom Lydia had decided to ignore afterseveral attempts of remedial help had not produced any change.[1]

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[1] Seuda had oral language difficulties and her classroom notes were chaotic. Seuda was often observed doing the wrong thing at the wrong time, to Lydia's immense exasperation. During episodes where Lydia demanded absolute attention from the class, Seuda would be observed writing, rifling through textbooks or reading. During notes-making sessions, Seuda would be staring out of the window or mumbling to her self. During one practical, instead of observing the assigned specimen, Seuda was observed reading a bible.

Joy's fault, according to Lydia, was that she whispered during note-taking and whenever she did not understand something, instead of putting up her hand to seek Lydia's help, she would put on a very gloomy face, implying that she demanded immediate attention regardless of whether or not Lydia was helping another student. Lydia had added, "If you don't go and help her as soon as possible, she will disrupt all the other students at the back." Mona and Charity were also regarded by Lydia as "perpetual whisperers", but unlike Joy, Lydia believed that, "they do it pleasantly and tend to put their hands up in oder to catch your attention".

Mona, Joy and Charity did not appear to be concerned about Lydia's occasional public expression of disapproval of their behaviour. Mona had explained that Lydia was more likely to "think" of students sitting at the back of the laboratory as misbehaving because, "she does not look at the sides." Charity had observed, " Mrs... knows that we are working. So even if she punishes us, we will still be working better." Lydia had one technique, the "prolonged stare", for silently indicating disapproval. The 'backbenchers' generally disliked this gesture, and part of the reason Joy had problems with Lydia was because she frequently ignored this prolonged stare preferring instead, tocontinue with either whispering to Mona or rifling through a book until she had been called verbally to attention by name.

Student Rating of the Quality of Biology Lessons

As the previous discussion has eloquently illustrated, within the context of the classroom, Lydia and her students primarily interacted around work which was to be completed by students. What this work was and how it was designed affected Lydia's and students' interactions (Blumenfeld et al.1980), and their perceptions of such interactions. To obtain a notion of what these perspectives were, short-term outcome measures based on ratings of aspects of lesson activity (Anderson and Barufaldi 1980) were made concerning teacher and student perceptions of the quality of various aspects of a lesson. It was expected that since the teacher and students were more familiar with their classroom procedures, their perceptions of the success of various aspects of lessons would have considerable validity. The ratings were designed to expand on the concept of student participation to include short-term outcome measures of lessons such as perceived importance of content by students, usefulness of lesson content to daily living, student enjoyment and overall satisfaction with the lesson. There was also an attempt to assess whether or not students were aware of any difficulties the teacher might have in presenting content and maintaining order and discipline in class.

Student ratings of the short-term outcome measures of biology lessons were carried out throughout the first and second year of research. No lesson ratings were done in the third year. Altogether 23, 40 minute lessons (10 in 1983 and 13 in 1984) and twenty-six 80 minute lessons (16 in 1983 and 10 in 1984), representing a total of 62.8% of all observed lessons, were rated. The lesson rating form consisted of 9 statements. Each statement had to be rated on a 10 point scale which was divided into four categories: Rating 1, 2, 3, were regarded as low scores, 4, 5, 6 marginal scores, and 7, 8 average scores and 9 and 10 as high scores. All the ratings for a particular statement for all students were summed up for the two years and the frequencies were converted into percentages and are presented in Table 1. In addition, every time students rated a lesson, the teacher also rated the same lesson. For instance, Lydia rated 49 lessons and for each lesson, she was asked to rate for instance, the number of students whom she thought understood the lesson. The total number of students whom Lydia indicated were summed up for each statement, and percentages, which are reported on the right of Table 1, derived.

Table 1: Student and Teacher Ratings of Lessons
(Percentages in brackets, T= Teacher)

			Student	Ratings		
Criteria	1,2,3	4,5,6	7,8	9,10	Total	T
1. Understanding of lesson content. (100)	1 (2.5) (60.0)	5 (12.5)	19	15 (47.5)	40	(32.5)
2. Student participation in asking questions, giving answers and (25.0) other tasks.	7 (17.5) (100)	13 (80.0)	10 (32.5)	10	40 (25.0)	
3. Amount of new knowledge (100) learned in lesson.	1 (2.5)	8 (20.0)	17	14 (42.5)	40	NA (35.0)
4. Importance of lesson content. (100)	3 (7.5) (80.0)	12 (30.0)	9	16 (22.5)	40	(40.0)
5. Usefulness of lessons to daily living.	2 (5.0)	5 (12.5)	9	24 (22.5)	40 (60.0)	NA (100)
6. Enjoyment of lessons. (100)	2 (5.0) (70.0)	6 (15.0)	12	20 (30.0)	40	(50.0)
7. Difficulty of content for teacher to teach. (100)	2 (5.0) (30.0)	7 (17.5)	20	11 (50.0)	40	(27.5)
8. Inability of teacher to control discipline. (100)	2 (5.0) (10.0)	11 (27.5)	15	12 (37.5)	40	(30.0)
9. Overall satisfaction with the lesson. (40)	5 (12.5) (100)	9 (90.0)	10 (22.5)	16	40 (25.0)	

It should be noted that two statements on the student rating form had no corresponding statements on the teacher form.[1] How congruent were studentand teacher ratings on those aspects of the lesson rated by both groups? In view of what has earlier been described with regard to student participation, student ratings on item 2 are quite interesting. On average,17 students felt themselves as marginally participating in class as opposed to Lydia's belief that 32 students were on the average, involved and participated in these activities. The explanation for this discrepancy might lie in the incongruent definition of participation by Lydia and the students. Students tended to not consider student-initiated questions as part of "real" participation in class. Thus in a class where close to 15 students were regularly involved in initiating and "staging" question sessions, it is conceivable that the same students did not regard this as genuine participation. Similarly, students did not regard as participation, occasions when the teacher picked on a student to answer a question when the student had not raised her hand. Students seemed to view participation as confined to "doing and setting up experiments, note-taking and making diagrams, carrying out observations and going out to collect biological materials.

The majority of students saw the usefulness of biology lessons to daily life as indicated by their ratings in item 5. This feeling was probably enhanced by the fact that Lydia often allowed students to discuss their practical experiences of concepts and their application to life. She also allowed students to ask questions about such applications so that students would probably derive ideas on the use of knowledge of biology in life contexts. For example, during discussion of the topic *Nutrition*, the school diet had been discussed and students had visited the kitchen and kept records of foods served daily in order to work out comparisons between food intake and energy expenditure. Similalry, during discussion of the topic *Dentition* the dentist's work "and its ugliness" had been exhaustively considered, after students had examined a skeleton's badly stained teeth.

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[1] Teachers had indicated during consultations on designing the rating form, that since they always taught new knowledge which had some importance, it would not be useful for them to rate these two aspects.

Close to 80 percent of the students indicated that that they regularly enjoyed the lessons, and thought that Lydia had little difficulty in dealing with the content. However, at least 13 students were not convinced that Lydia managed discipline well. Cross-checking the observation records with the rating forms, had revealed that most of these students were 'front and 'midbenchers' who as earlier indicated, generally disapproved of the way Lydia seemed to allow the 'backbenchers' to show off and generate noise. Fourteen students were generally dissatisfied with Lydia's lessons. As earlier pointed out, some students did not like the extended periods of note-taking and drawing; other did not like the apparently lax manner with which Lydia handled the 'backbenchers'; and still others disliked Lydia's habit of abbreviating notes on the blackboard.

Summary and Concluding Remarks

This report's title Backbenchers As Pacesetters: A Small Price for Individualism, has portrayed how a teacher's personal beliefs based on notions of the uniqueness of the individual, supported her perceptions, her thinking and ultimately, her classroom practice. Lydia's beliefs were generally liberal and positive, interlaced with various elements of ambivalence. Throughout her instructional strategy, Lydia strived to provide opportunities for the expression of student's individualism, thus her emphasis on encouraging students to ask questions, to contribute to lesson dialogue and debate, and to allow students to devolve multiple working groups during practical work.

Lydia's class was made up of students, some of whom were very fluent and were quite confident of themselves at the beginning of the year, while the rest were less fluent and less confident and unsure as to how to chart out independent ways of constructing meanings out of their classroom experience. Working within Lydia's relatively liberal instructional strategy, the more fluent students, the 'backbenchers', were able to quickly understand the major components of Lydia's strategy and begin to reshape their own participation in it. Initially, the 'backbenchers' had influenced classroom events by focusing Lydia's attention to their contribution and thereby claiming a disproportionate involvement in dialogue as a result of their oral fluency. The less fluent members of the class, the 'midbenchers', seem to have realized their disadvantage, and had sought to equip themselves with the ostensibly, more acceptable English accents used by the 'backbenchers'.

But while the 'the midbenchers' had strived to learn the communication patterns of the 'backbenchers', the latter had consolidated their influence on not only classrom dialogue but also on the pace at which the teacher delivered content and on the types of activities that she regularly asked students to undertake. But in seeking to control the pace of learning, the 'backbenchers had subtly exploited techniques that fitted well into Lydia's own instructional strategy in order to meet their own needs and in fact, had convinced Lydia that they had no other purpose in exploiting such techniques than learning and consolidating what they had been taught. The techniques which were staged by students, and which might be considered disruptive to some students who did not willingly participate in them, were mostly beneficial to the whole class, since their use forced Lydia to clarify fuzzy concepts, elaborate on explanations, bring more students into discussion and debate, and generally, contributed to the creation of a classroom atmosphere of ease where the expression of independent thought was encouraged. It could be argued, of course, that the techniques wasted classtime by diverting Lydia from her mental lesson plan and by sometimes, introducing subjects for general discussion, which had dubious relevance to the biology syllabus. It is perhaps, reasonable to assume that Lydia was really the final arbitor in this matter. Since she did not actively seek to put an end to such episodes, it can only be assumed that she regarded them as useful to her overall instructional strategy and to the teaching-learning process.

But what the data have revealed is an important aspect of effective peer learning among secondary school students. Research on peer learning in classroom has traditionally concentrated at the kindergarten level where children are said to learn from each other skills such as general attentional support, referential specificity and effective communicative exchanges (Cooper et al. 1980; Corsaro 1985; Cadzen 1986). It was quite clear in Lydia's class that secondary school students influenced and 'tutored' their peers in more or less the same skills as those taught to younger children, particularly, in the area of effective communicative exchanges and access to classroom dialogue.

The data in this report strongly support the earlier contention that a teacher's general belief system consiting of concept of self, and knowledge of and about: authority relations in the work environment; student abilities; the subject matter; and instructional techniques; all influence the actual instructional and participation strategies that are implemented in the classroom. Lydia was able to articulate a particular personal belief system which was observed to definiely guide her decisions and actions during the teaching-learning process. It was also clear, that if Lydia was to contemplate change in her instructional strategy she would have to examine and alter some of her beliefs. It was pointed out that Lydia was quite adamant about the efficacy of her instructional techniques, insisting that time was the limiting factor to her ability to achieve all her goals. Therefore, any intervention designed for example, to assist Lydia to increase the efficiency of her use of time, would initially have to deal with Lydia's use of time and her perceptions of the contribution of various elements in the instructional strategy to her goals. It would seem therefore, that change and improvement of teaching and learning at the classroom level is unlikely to be the result of mass legislation. It would appear that teachers, particularly, experienced teachers, need to find the incongruencies between their traditional 'workable' instructional techniques and the new strategies being exhorted by legislation. Yet the process and methods by which teachers come to fully appreciate the need for change would appear to be slow, intensive, reflective and small scale.

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